

**Inflation Stabilization: The Vietnamese
Experience in the 1980s and 1990s**

Vo Tri Thanh

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Acknowledgements

In the writing of this thesis, I have benefited substantially from the help, comments and suggestions of many people. The most important contribution has been that of my principal supervisor, Dr. Suwah Leung. Her meticulous approach to reviewing initial drafts has significantly improved my work. Of more importance than her assistance, it has been the enthusiasm she has shown towards my work. For her academic guidance and encouragement, I will always be grateful.

Declaration

Except where otherwise indicated, this thesis is my own work

I would like to thank Professor Ron Duncan has devoted a great deal of his time to viewing the outlines of chapters and his comments have been very beneficial. I have also benefited from the valuable discussions with Dr. Graeme Wells, particularly in the early stages of my research. I would also like to extend my thanks to Dr. Neil Voudsen who read some of the theoretical chapters, and to Dr. Kalirajan who read the statistical appendix.

My thanks also go to the staff of the National Centre for Development Studies (NCDS) for all the help and assistance provided during my years of study. I am especially indebted to Mrs. Billie Heaton for moral support and for improving my English during my stay at the NCDS. I also thank the Central Institute for Economic Management (Hanoi, Vietnam) and the State Bank of Vietnam for helping me with my research during my study and research. Special thanks go to the Australian Agency for International Development (AusAID) for financial assistance for my studies.

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Abstract

Vietnam undertook its first steps towards economic reforms at the beginning of the 1980s. As a result, it moved away from a strictly centrally-planned to a 'modified' planned economy. However, Vietnam failed to stabilize the economy. The so-called 'price-salary-money' reform in 1985 resulted in annual inflation accelerating to several hundred percent. Since the market-oriented reforms in 1989, however, Vietnam has succeeded in bringing inflation under control. The subsequent inflation stabilization and rapid economic growth has indeed been considered one of the most remarkable turnarounds in economic history.

This thesis analyses the process of inflation stabilization in Vietnam, focusing on the 1985-reform, the stabilization policy package in 1989, and the market-oriented reforms since then.

First, the thesis explains the failure of the 1985-reform and the success of the 1989-reform. The explanation is based on the theory of 'repressed' inflation in a centrally-planned economy and on the consideration of the increasing role of the parallel market resulting from the microeconomic reforms introduced in the early 1980s. The thesis argues that the disappointing outcome of the 1985-reform was mainly due to the government's failure to deal with the public deficits, while exaggerating the problem of 'monetary overhang', leading to unnecessary confiscatory monetary measures¹. The much greater focus on the problem of public deficits in the 1989-reform together with the increased credibility of government policies were the key factors in explaining the success of inflation stabilization in 1989.

¹ The new domestic currency (Dong) replaced the old Dong at a rate of one to ten, and the immediate exchange was limited.

The thesis also examines a wider range of factors that could be important for understanding the inflationary movement since the 1989-reform: from the financial reform and the ability to control money supply by the central bank, to the underlying determinants of inflation, the dynamics of inflation and the conditions for stability of inflation. Up to now, public finance has played a very important role in money supply, and the underdevelopment of the financial sector still constrains the efficient use of the market-based monetary instruments. The key determinants of inflation rate have been found to be money growth rates and the factors reflecting the attractiveness of the domestic currency such as the (expected) depreciation rate and the deposit interest rate. Another main finding is that the relatively low inflation in recent years has tended to be stable; however, the process towards financial stability is not yet firmly established.

Based on these findings, the thesis suggests a policy package for sustaining a low inflation rate. It is important for the central bank to strengthen its independent role in conducting monetary policy and to implement more market-based direct control over money supply while gradually gaining experience with the use of indirect monetary instruments. In particular, the policy package should maintain the existing conditions for the stability of inflation, and aim at keeping the economy at a lower inflation equilibrium. In that sense, a firm commitment to price stability and a more rigorous adjustment of public finance are essential elements in the policy package. This also creates an easier condition for pursuing more reasonable interest rate and exchange rate policies; that is, policies to reduce the costs of economic activities, while keeping the attractiveness of the domestic currency.

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Glossary

Abbreviation:

| | | |
|-----------|---|--|
| ADF | = | Augmented Dickey-Fuller (test) |
| AgriBank | = | Vietnam Bank for Agriculture |
| ASEAN | = | Association of South-East Asian Nations |
| BIDV | = | Bank for Investment and Development of Vietnam |
| CIEM | = | Central Institute for Economic Management (Hanoi, Vietnam) |
| CMEA | = | Council of Mutual Economic Assistance |
| CPE | = | Centrally-planned economy |
| CPI | = | Consumer price index |
| D-W | = | Durbin-Watson (statistic) |
| DF | = | Dickey-Fuller (test) |
| ECM | = | Error-correction model |
| FPE | = | Final Prediction Error |
| GDP | = | Gross domestic product |
| GSO | = | General Statistical Office of Vietnam |
| ICOR | = | Incremental capital-output ratio |
| IMF | = | International Monetary Fund |
| IncomBank | = | Industrial and Commercial Bank of Vietnam |
| LM | = | Lagrange multiplier (test) |
| MPE | = | 'Modified' planned economy |
| NI | = | National income |
| OLS | = | Ordinary Least Square (estimation) |
| PAM | = | Partial adjustment model |

| | | |
|-------------|---|-------------------------------------|
| PPP | = | Purchasing power parity |
| RHS | = | Right-hand side |
| RMSFE | = | Root-mean-square forecast error |
| SBVN | = | State Bank of Vietnam |
| SOCB | = | State-owned commercial bank |
| SOE | = | State-owned enterprise |
| SPC | = | State Planning Committee of Vietnam |
| VAR | = | Vector autoregression (model) |
| VietcomBank | = | Bank for Foreign Trade of Vietnam |

For tables:

| | | |
|----|---|----------------|
| .. | = | Not available |
| NA | = | Not applicable |

¹See, for example, Adams (1994), Balcerowicz and Cello (1993), Blanchard et al. (1994), Fischer and Cello (1991), Lipson and Taylor (1990), Poljak (1990), and World Bank (1996).

Chapter 1

Introduction

‘The rejection of central planning by so many countries in 1989 represents one of the truly extraordinary events in the history of economics. But the transition to the market also presents economists with formidable challenges because the path has never been trod before. The issues raised will remain at the top of the economic agenda for many years to come’ (*Socialist Economies and the Transition to the Market: A Guide*’ (Jeffries 1993: i)).

Although the transition debate still continues, there is now consensus about the ‘nuts and bolts’ of transition, which encompasses three sets of reforms: liberalization and stabilization; institutional changes that support market exchange and shape ownership; and the establishment of social programs to ease the pain of transition¹. The maintenance of macroeconomic stability is considered an essential complement to liberalization and vital for transition since it ensures the gains from market-oriented reforms and provides the necessary condition for sustained growth. Moreover, in economies characterized by a heavy distortion of resource allocation, poor incentives, and poor information as in the centrally-planned economies (CPEs), consistent policies, combining liberalization of prices and trade, and freedom of entry into markets, while stabilizing the economy, can achieve a great deal even when clear

¹See, for example, Ahrens (1994), Balcerowicz and Gelb (1995), Blanchard *et al.* (1991), Fischer and Gelb (1991), Lipton and Sachs (1990), Nordhaus (1990), and World Bank (1996).

property rights and strong market institutions are still lacking (World Bank 1996, Chapter 2).

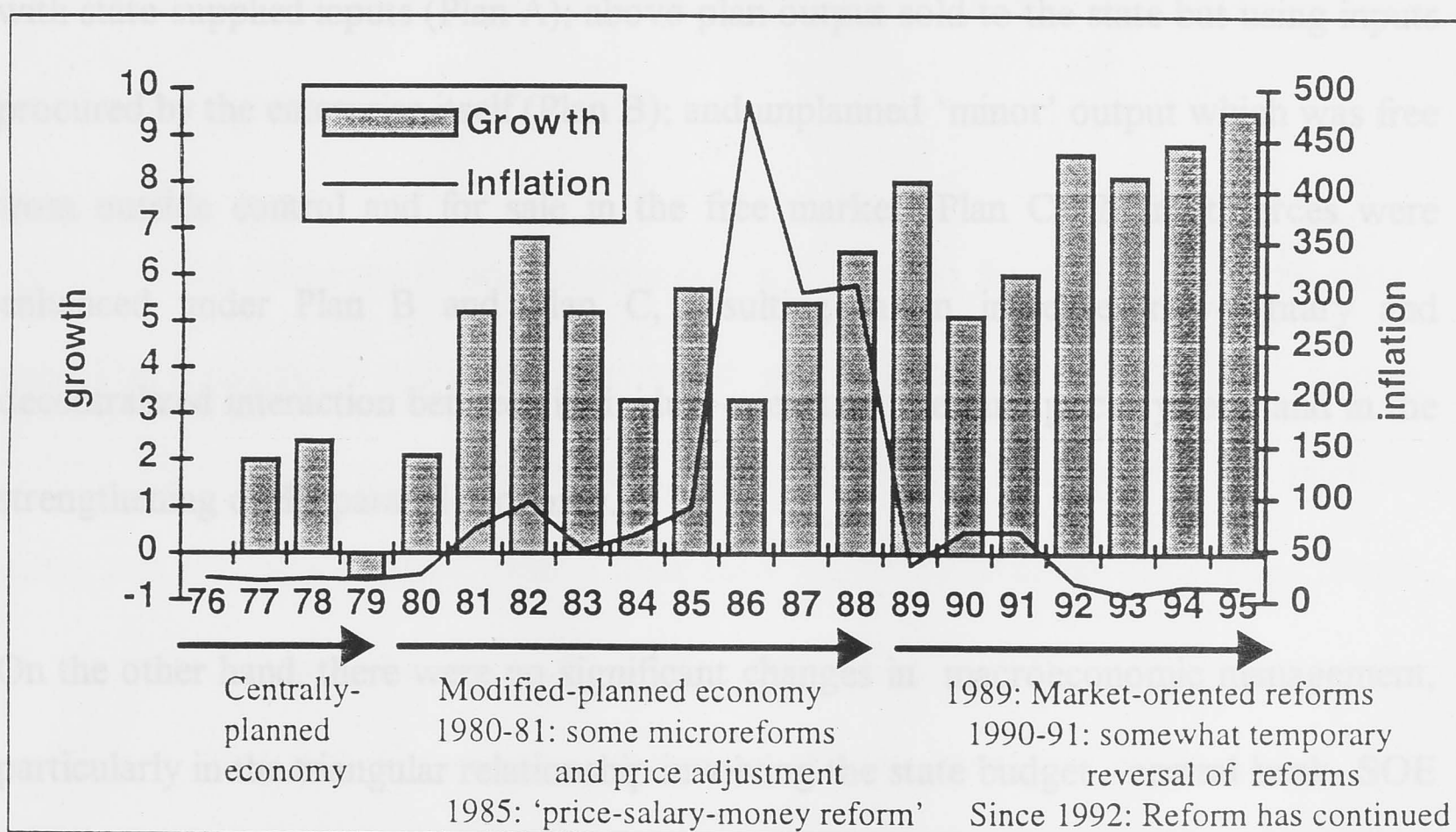
The process of macroeconomic stabilization in Vietnam is unique amongst the transitional economies. Since the radical reform in the spring of 1989, Vietnam has brought inflation under control, while maintaining high rates of economic growth. The result is very impressive in comparison to the experiences of many transitional economies in Eastern Europe, although the liberalization and stabilization measures used were similar to these economies (Riedel and Comer 1996, World Bank 1996). But the success did not come overnight. Unlike China, which has had relative success in implementing the piecemeal and partial reforms (Chen *et al* 1992), Vietnam had to pay a high price for this kind of economic reform in the 1980s. High inflation with devastating effects became a disease of the economy throughout the 1980s. The study of Vietnam's stabilization during both the periods of the 1980s and 1990s, therefore, directly addresses the issue of radical reforms versus 'gradualism'.

1.1. Economic reform and the outcomes of inflation stabilization in Vietnam

Prior to the 1980s, Vietnam followed the Soviet economic model closely. The characteristics of the Vietnamese economy were essentially those of a traditional CPE, namely, state ownership of means of production; government administered physical input, output, and prices; a single government bank and a passive financial system; relatively autarkic trade with heavy reliance on trade within the former trade block of socialist countries, the Council of Mutual Economic Assistance (CMEA); and a heavy

industry orientation in investments. As a result, the Vietnamese economy suffered from persistent shortages with low levels of per capita consumption and inefficiency of investments. By the end of the 1970s, industrial production had stagnated, food production had fallen to very low levels, forcing Vietnam to import large amounts of rice, and the balance of payments position worsened (Fforde and Vylder 1988, Lipworth and Spittaller 1993). The failure of the centrally planned system had become apparent and pressures for reform increased substantially.

Figure 1: Economic Reforms, Growth, and Inflation (%-change p.a.), 1976-95



Note: Inflation is December-December percentage increase in the consumer price index (CPI); Growth is percentage change of real national income (NI) for 1976-88 and of real GDP for 1989-95.

Source: For inflation rate, from SPC (1994) and World Bank (1992, Table 6.1,p.146); for data of NI and GDP, from Kimura (1989, Tables 1-2,p.11), SPC (1994) and World Bank (1993,Table 2.1,p.235). Revised data of 1994 and 1995 are provided by the Central Institute for Economic Management (CIEM, Hanoi).

During 1980-88, the economy was a kind of 'modified' planned economy (MPE). Some partial reforms undertaken within the framework of a CPE made only a marginal difference since they did not attempt basic changes. However, there were some significant initiatives undertaken such as 'fence breaking'² and reforms from the 'bottom'. In 1981, the Vietnamese government tried to create incentives in the agricultural sector through the contract system which permitted households to sell a certain proportion of their products at the 'free' market price. Within the state-owned enterprise (SOE) sector, the so-called 'Three-plan system' was also introduced. Under this system, the SOE plan consisted of three parts: state-assigned output manufactured with state-supplied inputs (Plan A); above-plan output sold to the state but using inputs procured by the enterprise itself (Plan B); and unplanned 'minor' output which was free from outside control and for sale in the free market (Plan C). Market forces were enhanced under Plan B and Plan C, resulting in an increase in voluntary and decentralized interaction between individual agents, in the dual price system, and in the strengthening of the parallel economy.

On the other hand, there were no significant changes in macroeconomic management, particularly in the triangular relationship involving the state budget - central bank- SOE sector. The 'socialist organized' market was still emphasized, and there were not yet major changes in attitude to the private sector. The financial reform in 1985 addressed the issues of price, salary, and money, but proceeded without addressing the fundamental problems of resource misallocation and imbalances in the economy.

²The attempts of the economic units (agricultural cooperatives, state-owned enterprises) to operate outside the plan without seeking permission.

Although the output expansion was somewhat improved, high rates of inflation emerged, and in the mid-1980s, accelerated to several hundred percent (Figure 1).

In the spring of 1989, Vietnam adopted a comprehensive reform package aimed at stabilizing the economy, removing inefficient administrative control, and enhancing freedom of choice for economic units and competition so as to change fundamentally the economic management system in Vietnam. The reform measures included almost complete price liberalization, large devaluation and unification of the exchange rate, increases in interest rates to positive levels in real terms, substantial reduction in subsidies to the SOE sector, encouragement of the private sector and a return to family farming on the basis of long-term leases.

Since then the transition to an economy driven by market forces has been well under way. The government has already instituted many of the specific reforms in pricing policy, the external sector, agriculture, fiscal policy, the SOE sector, the financial sector and the labour market, which have been necessary to effect this change. Some of the most fundamental economic prerequisites of a market economy have been established. They include generally unregulated, market-determined prices, a legal basis for property rights and commercial transactions, a significant role for the non-state sector, independent firms motivated by economic considerations and a harder currency³. Vietnam has also taken some important steps on the road to a more market-oriented financial system.

³ For economic requirements of a systemic transformation from a CPE to a market-based economy, see Ahrens (1994) and Ericson (1991).

Table 1: Some Macroeconomic Indicators (1989-95)

| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 |
|---------------------------------|------|------|-------|------|------|------|------|
| Inflation (CPI, %) | 34.7 | 67.5 | 67.6 | 17.5 | 5.2 | 14.4 | 12.7 |
| GDP growth (%) | 8.0 | 5.1 | 6.0 | 8.6 | 8.1 | 8.8 | 9.5 |
| -Industry | -4.0 | 3.0 | 8.6 | 13.3 | 12.9 | 13.0 | 14.0 |
| -Agriculture | 6.9 | 1.5 | 2.2 | 7.2 | 3.8 | 4.5 | 4.7 |
| -Services | 17.6 | 10.8 | 8.6 | 7.2 | 9.4 | 12.5 | 12.6 |
| Gross Investment (% GDP) | 11.7 | 11.7 | 15.0 | 17.6 | 20.5 | 23.8 | 25.6 |
| Gross D. Savings (% GDP) | 3.4 | 7.5 | 10.1 | 13.8 | 14.8 | 16.6 | 18.0 |
| CA ^a balance (% GDP) | -8.3 | -4.2 | -4.9 | -3.8 | -5.7 | -7.2 | -7.6 |
| Export (Mill.US\$) | 1320 | 2404 | 2087 | 2580 | 2985 | 4060 | 5200 |
| (in % change) | 80.1 | 82.1 | -13.2 | 23.6 | 15.7 | 36.0 | 28.1 |
| Import (Mill.US\$) | 1670 | 2752 | 2338 | 2540 | 3924 | 5800 | 7500 |
| (in % change) | 18.3 | 64.8 | -15.0 | 8.6 | 54.5 | 47.8 | 29.3 |
| Openness(Trade/GDP) | 0.45 | 0.78 | 0.59 | 0.52 | 0.54 | 0.61 | 0.61 |

Note: a- CA = Current Account.

Source: The estimation and data are based on data from SPC (1994) and World Bank (1994a: Table 2.1,p.4). Revised data of 1994 and 1995 are provided by the CIEM (References to data in Dang Duc Dam (1995a), GSO (1994) and Le Dang Doanh (1995) also are made).

As a result, Vietnam entered a new phase of economic development. This is reflected in the impressive improvement in the macroeconomic performance (see Table 1). Between 1989 and 1995, the economy's growth was strong with real GDP increasing at an annual average rate of 7.7%. The initial stages of trade liberalization, and the unification and devaluation of the exchange rate in 1989 led to an extraordinary surge in exports, which grew by more than 80% in both 1989 and 1990. Since 1992, the rate of growth of exports has been high, at an average of 25.8% per year, despite the appreciation of the exchange rate. A substantial increase in both domestic saving and foreign capital inflows has supported a large increase in investment, from 11.7% in

1989 to nearly 26% of GDP in 1995. But bringing inflation under control may be regarded as the government's greatest success (Riedel and Comer 1996). By 1989, inflation was down to 34.7%. Although the annual inflation rate surged again to more than 67% in 1990 and 1991, the years associated with a temporary reversal of reforms, it has declined to single-digit and moderate double-digit levels since 1992. In terms of economic growth and inflation control, Vietnam has had a very impressive performance in comparison to many other CPEs (see Tables 1 and 2). At present, Vietnam seems to be progressing toward financial stability and sustained growth.

Table 2: Countries in Transition: Real GDP and Inflation (%-change p.a.)

| Country | GDP growth rate | | | | | | Change in CPI | | | | | |
|-----------------|-----------------|-------|-------|-------|-------|-------|---------------|-------|-------|-------|-------|-------|
| | 90 | 91 | 92 | 93 | 94 | 95 | 90 | 91 | 92 | 93 | 94 | 95 |
| Albania | -10.0 | -27.7 | -9.7 | 11.0 | 7.4 | 6.0 | 0.0 | 35.5 | 225.9 | 85.0 | 28.0 | 8.0 |
| Belarus | -2.8 | -1.5 | -10.1 | -9.0 | -21.5 | -12.0 | 4.5 | 83.4 | 969 | 1188 | 2200 | 800 |
| Bulgaria | -9.1 | -11.7 | -6.0 | -4.2 | 0.0 | 3.0 | 22.0 | 333.5 | 82.0 | 72.8 | 89.0 | 62.0 |
| Croatia | .. | -15.1 | -12.8 | -3.2 | 1.8 | 2.0 | 135.6 | 249.5 | 938 | 1516 | 98.0 | 4.1 |
| Czech Republic | -1.2 | -14.2 | -6.4 | -0.5 | 2.6 | 5.0 | 10.8 | 56.7 | 11.1 | 20.8 | 10.2 | 9.1 |
| Hungary | -2.5 | -7.7 | -4.3 | -2.3 | 2.5 | 2.0 | 29.0 | 34.2 | 22.9 | 22.5 | 19.0 | 28.2 |
| Kazakstan | -4.6 | -6.8 | -13.0 | -15.6 | -25.0 | -9.0 | 4.2 | 91.0 | 1610 | 1760 | 1980 | 180.0 |
| Mongolia | -2.0 | -9.9 | -7.6 | -1.3 | 3.3 | 6.3 | 0.0 | 208.6 | 321.0 | 183.0 | 145.0 | 75.0 |
| Poland | -11.6 | -7.6 | 2.6 | 3.8 | 5.5 | 7.0 | 586.0 | 70.3 | 43.0 | 35.3 | 32.2 | 27.8 |
| Romania | -5.6 | -12.9 | -13.8 | 1.3 | 2.4 | 7.0 | 5.1 | 174.5 | 210.9 | 256.0 | 131.0 | 32.3 |
| Russia | -3.6 | -5.0 | -14.5 | -8.7 | -12.6 | -4.0 | 5.6 | 92.7 | 1353 | 896 | 303.0 | 190.0 |
| Slovak Republic | -2.5 | -14.6 | -6.2 | -4.1 | 4.8 | 7.0 | 10.8 | 61.2 | 10.1 | 23.0 | 14.0 | 9.9 |
| Ukraine | -3.8 | -12.0 | -12.5 | -7.2 | -24.3 | -12.0 | 4.0 | 91.2 | 1210 | 4735 | 842 | 375.0 |

Sources: World Bank (1996, Tables A2 and A3, pp.173-4).

Vietnam is, however, still facing many problems typical of low-income countries. Although liberalization has been quite broad and fast, significant restrictions remain, for example, in the areas of trade and market entry. Moreover, the reforms of the

SOEs and financial sector are not keeping pace with economic development (World Bank 1996). In particular, Vietnam is regarded as an 'under-banked' country with a lack of confidence in the financial system. In general, Vietnam can be seen as a market-based developing economy. Therefore, there is still some way to go in transforming Vietnam from a poor to a prosperous country, comparable to the other rapidly growing countries in the Asian region.

1.2. Objective, approach and organization of the study

The objective of this thesis is to explain the outcomes of the efforts to stabilize the economy in the years 1985, 1989, and in the first half of the 1990s.

The failure of the 1985-reforms, the success of the 1989-package, and the apparently sustained low inflation since 1992 makes Vietnam's macroeconomic stabilization experience unique amongst transitional economies. The renovation in Vietnam has been essentially a process of 'learning by doing' and characterized by gradualism. The radical reform in 1989 was an exception, but so far it is considered the most successful since the basic conditions were created for the transformation into a market economy (Le Dang Doanh 1994). At present, the efforts to continue to stabilize the economy, keep a low and manageable inflation rate, and reform the financial system as the means of intermediation between savings and investment are playing a crucial role. This will ensure the efficiency of resource mobilization and allocation; and hence, Vietnam can continue to sustain high economic growth⁴.

⁴During 1989-95, the Incremental Capital-Output Ratio (ICOR) was low, in the range of 2.0-2.5, in comparison to the typical range of 3-4 for developing countries. Several factors explain Vietnam's high growth rate of GDP with low ICOR (Dollar 1994, World Bank 1993). First, some large, fixed

A number of studies have already been undertaken to examine the issue of inflation stabilization in Vietnam. Preliminary assessments of the 1985 and 1989-reforms are given in Van Brabant (1990b) and Wood (1989). The study by Kolodko *et al* (1992) provides a more comprehensive explanation of the success of the 1989-reform. This study, however, did not emphasize the reasons behind the difference in outcomes of the two sets of reforms in 1985 and 1989. Recently, the inflation stabilization in the context of the overall reforms has been described by the World Bank (1993 and 1994b), Dollar (1994), and Riedel and Comer (1996). Also, the possible effect of the change in the exchange rate on inflation has been a major bone of contention among Vietnamese economists (see, for example, Le Viet Duc and Tran Thi Thu Hang (1995), Nguyen Cong Nghiep and Le Hai Mo (1995), Vu Ngoc Nhung (1995)). Partly due to the difficulties of obtaining and interpreting Vietnamese statistical data, these earlier studies focused mainly on the institutional changes and/or policy issues, and rarely used quantitative analyses.

By combining both economic theory and econometric techniques, this thesis aims to provide a better understanding of the process of inflation stabilization in Vietnam throughout the 1980s and the first half of the 1990s. The thesis, thus, can assist in the design of an appropriate anti-inflation program for Vietnam.

investments of the mid-1980s (during the period of Soviet aid) have been coming on line in the early 1990s, so that some of the increments to GDP have been based on these earlier investments. Second, the initial response of economic activities to the removal of previous distortions permitted a large increase in output based on only minor additional investments. The institutional changes in favour of a market oriented and more export-oriented economy, of course, have made a decisive contribution to this response. As projected, in the medium and longer term, however, Vietnam will need much greater investment and higher ICOR if it is to continue to sustain the annual growth rate at 8-9% (Dollar 1994, Le Dang Doanh 1995, and World Bank 1994b).

The approach adopted here was used recently by Dodsworth *et al* (1996) and Ngo Huy Duc (1995 and 1996) in order to investigate some aspects of the inflation issue in Vietnam in the first half of the 1990s. The study by Dodsworth *et al* (1996) examines the influence of money on inflation through the estimations of a polynomial lag model and the impact of the changes in rice price on inflation by using an error-correction model (ECM). Ngo Huy Duc (1995 and 1996) has used the transaction cost model of demand for money as a base for testing the degree of dollarization and then, the effects of dollarization on inflation.

In this thesis, the focus is on the relationship between the financial system and government finance as fundamental to an understanding of the Vietnamese economy in the 1980s and 1990s. The reasons are as follows: Firstly, since the reform of a CPE is, in essence, a monetization of economic transactions and decision making, the financial sector should play a key role in this process. Secondly, the features associated with the financial system and the behaviour of the SOEs under a CPE, like repressed inflation associated with 'monetary overhang' and chronic shortage, are problems that tend to plague many CPEs in transition. Due to these special features and the large distortions in the economy, price liberalization and stabilization may also require additional measures over and above the standard stabilization package of reductions in fiscal deficit and control of money supply (see, eg. Blanchard *et al* 1991). Finally, even if the structure of a modern financial system reform is in place, the problem of quasi-fiscal deficit cannot be easily solved, given the close relationship between the SOE sector and the state-owned banks that still dominate the financial system. This is particularly the case in Vietnam, where 'the government has accepted

the necessity of a market economy, but seems to prefer one it can control and command' (Riedel and Comer 1996).

In view of the above considerations, this thesis addresses the following questions:

What are the key factors explaining the failure of the 1985-reform and the success of the 1989-reform? What policies should be adopted to keep inflation under control and to sustain a low inflation rate from now on? The answer to the second question, again, depends on how the following questions will be answered: First, how can the central bank effectively control money supply? Second, what are the underlying determinants of inflation? And third, is the new relatively low inflation rate stable?

The remainder of the thesis is organized as follows:

Chapter 2 discusses the Vietnamese experience of price reform and stabilization in the 1980s in the framework of the theory of the financial sector under a CPE. The first section of the chapter highlights three elements of this theory: the origins of 'monetary overhang' and repressed inflation in a CPE; the possible impacts of price liberalization and the implications for stabilization measures; the measurements of repressed inflation (Evidence from some CPEs is also briefly given). The Vietnamese experience is examined in the second section. The issue of 'monetary overhang' and the associated repressed inflation is examined, in addition to monetization of the budget deficit and deficits of the SOEs. The difference in outcomes between the 1985- and 1989-reforms is then explained in the light of this analysis.

Chapter 3 considers firstly the process of financial reform, the current financial structure in Vietnam and the capability of the central bank (State Bank of Vietnam) to use existing monetary instruments to control the money supply. Based on the monetarist versus structuralist approaches to the causes of inflation, the chapter then overviews the possible links between inflationary movement and other macroeconomic variables such as budget deficit, monetary aggregates, interest rates and exchange rates, and output since 1989.

Chapter 4 develops a simple dynamic model of seigniorage, inflation, and expectation for Vietnam. The model consists of three equations reflecting (a) the public finance through seigniorage, (b) the real demand for domestic money, and (c) the dynamic behaviour of the expected exchange rate in relation to inflation. The choice of this model depends not only on the key features of the financial sector and inflationary movement discussed in Chapter 3, but also on the consideration of the types of theoretical models which have been used to examine the inflationary phenomenon in developing countries and in transitional economies. The model can explain the dynamics of inflation rate together with the (expected) depreciation rate and shows the condition necessary for a stable inflation equilibrium (in steady state). Two cases are analysed within the framework of this model: when fiscal policy dominates monetary policy and vice versa.

Chapter 5 uses econometric analysis to provide insight into the determinants of inflation in the aftermath of the 1989-reform and to ascertain whether the new relatively low inflation rate is stable. To find the determinants of inflation and their effect on inflation rate, a distributed-lag model is used. The answer to the question of

inflation stability depends on the estimates of the parameters of the model specified in Chapter 4.

Chapter 6 discusses the options for an appropriate anti-inflation program, based on the analyses of the three preceding chapters. The discussion focuses on the following problems: the issue of the inflationary target; the role of the central bank, and the effective use of monetary instruments and the choice of monetary aggregates; and the choice of policy instruments in sustaining low inflation rates. In regard to the last problem, policy instruments such as monetary policy, fiscal policy, interest rate policy and exchange rate policy, are considered.

Chapter 7 summarizes the main contents and findings of the thesis.

The distinguishing characteristics of such a financial system in a CPE are well documented (see, for example, Holz 1982, Nug 1986, Wolf 1985) and can be summarized as follows:

- a banking system consisting only of the government state bank with no independent commercial banks (the so-called "monolithic" banking system);
- a totally accommodating or "passive" role for the state bank with regard to SOEs

This means that the SOEs were given credit at zero or very low interest rates in

This chapter is based on my own paper (Vo 1995) and the paper co-authored with Dr. Surin Lertkij (Lertkij and Vo 1995).

Chapter 2

Price Reform and Inflation

Stabilization in Vietnam in the 1980s⁵

2.1. A theoretical consideration of the problem of repressed inflation under centrally-planned economies

2.1.1. The financial system and money supply in a centrally-planned economy,

In Vietnam, the first steps in reforming the banking system were taken in mid-1988 with the transfer of commercial functions from the State Bank to four 'specialized' banks. Only in May 1990 were two decree-laws enacted, setting the basis for a market-oriented banking system. During the period before 1989 the banking system was, in essence, typical for a CPE.

The distinguishing characteristics of such a financial system in a CPE are well documented (see, for example, Holz 1992, Nuti 1986, Wolf 1985) and can be summarized as follows:

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This means that the SOEs were given credit at zero or very low interest rates in

⁵ This chapter is based on my own paper (Vo 1995) and the paper coauthored with Dr. Suiwah Leung (Leung and Vo 1996).

order to purchase raw materials and inventories to fulfil the planned production stipulated by the state. On the other hand, deposits with the state bank on the part of the SOEs could not be used by the SOEs without specific direction from the planners. This represents the so-called 'enterprise circuit' of the money supply process, and is associated with a 'credit plan'. Credit is supposed to grow at the same rate as output, and is therefore presumed to have no inflationary effects;

- households dealing only in cash. They were paid by enterprises in cash, and purchased goods and transacted amongst themselves using cash. This is the so-called 'household circuit' of money supply process, and is associated with a 'cash plan'. Operationally, the cash plan specifies factors resulting in injections and withdrawals of currency in the banking system. For example, wage and salary, purchase of agriculture product, and government transfers to households represent injections; the sale of consumer goods and services to the households as well as the household deposits in the state bank (a very minor item in reality) represent withdrawals. The aim is to keep a balance between the cash injections and withdrawals. Once the prices and quantities of consumer goods and services are determined under the physical plan, the cash plan sets the target for currency in circulation which is implemented by the state bank.

Formally, the model of the financial system in a CPE can be summarized in two identities of the nominal flow supply of currency in circulation:

$$\Delta CU = F + WN + T - PQ - \Delta HD \quad (1)$$

$$\Delta CU = \Delta NDCg + \Delta NDCe + \Delta R - \Delta HD \quad (2)$$

Here CU is currency in circulation, F is procurement payment for agricultural products, WN is the total wage bill paid to households, T is government transfers to households, PQ is the value of consumer goods purchased by households, HD is net household deposits at the state bank, $NDCg$ and $NDCe$ are the net domestic credit of the government and enterprise sector respectively, R is international reserves, and Δ denotes the change in the corresponding variables. The flow variables on the right-hand side of Equation (1) determine the balance of money incomes and expenditures of the population, whereas Equation (2)- nothing but a balance sheet of the state bank- shows how the sources such as the budget deficit and the change in credits to enterprises,⁶ could be channelled to the household monetary circuit.

Given the formulation of the credit plan and cash plan in the light of the physical input and output plans, interest rates virtually had no role in allocating financial resources. Moreover, the quantitative plan was usually 'taut', ie. the targets were not objectively feasible with the resources at hand (Van Brabant 1990a). Since output plan fulfilment was the prime criterion against which enterprise performance was evaluated, the easy credit at virtually zero interest rate meant that there was a strong incentive for enterprises to borrow from the state bank in order to pay for more materials and labour inputs than currently needed so as to ensure their availability for future output growth. Enterprises in this situation have been described as operating under a 'soft budget constraint'. Kornai points to the negotiability of tax rates, soft subsidies from the government budget, and soft credit as possible sources of an enterprise's soft budget constraint (1980 Chapter 13). As a result, there was a tendency for $\Delta NDCg + \Delta NDCe$

⁶Given the role of official exchange rates mainly as accounting devices to enable conversion between foreign and domestic prices to be made consistently, the change in net international reserves need not imply net hoarding or dishoarding in either the enterprise or household sectors (Wolf 1985).

to be greater than that in the plan, and this, in turn, became channelled to the 'household circuit'.

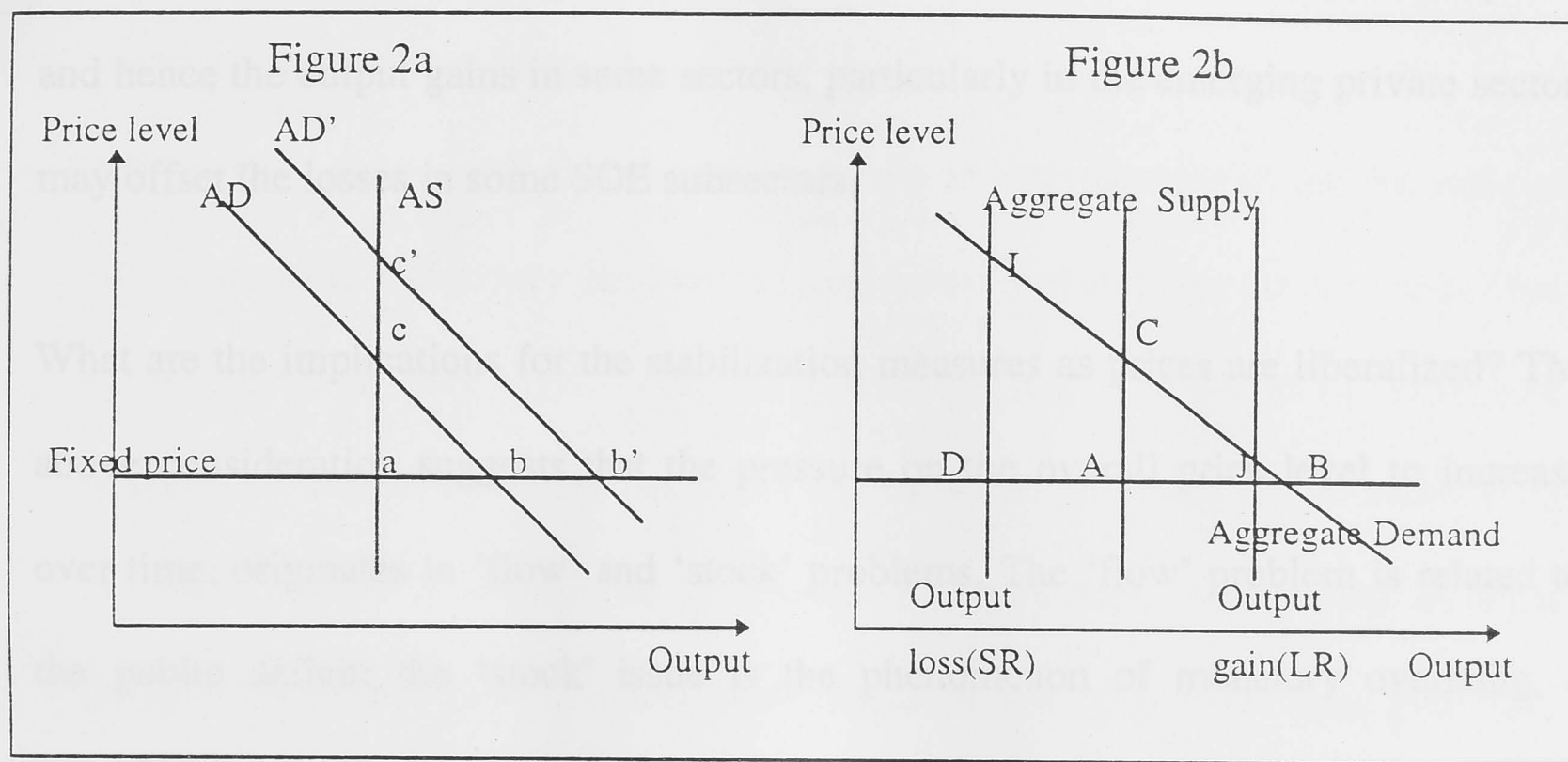
Since most households did not keep accounts at the state bank (either through non-availability of this facility generally or through lack of interest rate incentives), there was no mechanism by which an excess of money holding in the population could be eliminated by lending to enterprises. Furthermore, because of the heavy industry orientation of the CPEs, consumer goods were generally in short supply (Winiecki 1988), so that it was impossible to keep the cash withdrawals from the household circuit balanced with the cash injections into that circuit. This resulted in 'forced' money holdings on the part of the households, with the accumulation of these holdings giving rise to a 'monetary overhang'. The manifestation of this overhang of money stock is the persistent shortages in consumer goods, with controlled prices to avoid outbreaks of inflation; that is, a situation of 'repressed' inflation.

2.1.2. Impact of monetary overhang and implications for price liberalization

Figure 2a illustrates the impact of a growing monetary overhang. At initial equilibrium, with aggregate demand of AD and aggregate supply of AS , the general price is fixed below the clearing level and the excess of desired spending over output is given by ab . Point c is the 'true' price that could be reflected in the costs of waiting, bribing, and using influence. As the public deficit (that is, in our terminology, $\Delta NDC_g + \Delta NDC_e$, or the 'monetized' budget deficit and the net credit extended to enterprises) increases the monetary overhang, AD rises to AD' . The ex-ante shortage becomes

wider and grows to ab' and the true price rises to c' . Note that any increase in official prices may not be enough to eliminate excess demand and hence may lead to dualism in inflation (open and repressed inflation), that could be observed in many CPEs or MPEs.

Figure 2: Impacts of monetary overhang and price liberalization



Now suppose that the economy is characterised initially by aggregate demand ICB , aggregate supply with full employment AC , and a general shortage AB . When prices are liberalized, the general price rises toward point C in Figure 2b. In the short run, however, the general price may rise further toward I due to the contraction of aggregate supply: the inefficient enterprises become loss making in those parts of the economy where relative prices have fallen. Also, the contraction in loss-making enterprises would initially produce a slump in aggregate demand, and this may reduce output and employment in those markets where relative prices have risen due to the spillover effects across sectors. However, in the longer run when the new profit opportunities and market incentives begin to be exploited by entrepreneurs and

macroeconomic stability is achieved, the decline of output (AD) is gradually reversed and the economy ends up at point J with full employment output.⁷

The analysis, however, does not rule out the possibility of an increase in output even in the short run. In the MPEs with the substantial role of a parallel market, the economy may quickly respond to the 'price matter' when price liberalization has taken place, and hence the output gains in some sectors, particularly in the emerging private sector, may offset the losses in some SOE subsectors.

What are the implications for the stabilization measures as prices are liberalized? The above consideration suggests that the pressure on the overall price level to increase over time, originates in 'flow' and 'stock' problems. The 'flow' problem is related to the public deficit; the 'stock' issue is the phenomenon of monetary overhang, a growing mountain of money in the face of controlled prices and excessive demand. Because of the monetary overhang, governments may fail to achieve macroeconomic balance by simply stopping money creation. It is essential to remove the overhang, and

⁷That is why it is often assumed that the process of transition follows a *J-curve* phenomenon. Several economies in transition (see Table 2, Chapter 1, Section 1.1) seem to have experienced this phenomenon. However, the adjustment from A to J (permanent gain) via D (temporary loss) in Figure 2b may or may not increase the *present value* of output. To see this clearly, suppose that output falls from the initial level by ΔY from $t=0$ to $t=T$, and then exceeds its original level by $\theta\Delta Y$ from $t=T$ to $t=\infty$ where θ is some positive constant. Then the present values of the output loss and gain respectively are

$$\int_0^T \Delta Y e^{-\rho t} dt = \Delta Y (1 - e^{-\rho T}) / \rho \quad \text{and} \quad \int_T^{\infty} \theta \Delta Y e^{-\rho t} dt = \theta \Delta Y e^{-\rho T} / \rho \quad \text{where } \rho \text{ is the discount rate.}$$

The net gain can be found by subtracting the first equation from the second:

$$\Delta Y ((1 + \theta) e^{-\rho T} - 1) / \rho \quad \text{which is positive if } (1 + \theta) e^{-\rho T} > 1 \quad \text{or } T < \ln(1 + \theta) / \rho.$$

If, for example, $\theta=2$ and $\rho=0.05$, the structural adjustment would yield a positive net gain as long as it took 22 years or less (For more information, see Gylfason (1993)).

this can be done in one or more of the following ways (see Blanchard *et al* 1991, Dornbusch and Wolf 1990, Fischer and Gelb 1991, and Hinds 1992):

- Completely de-control prices so that the real value of money holdings declines to the desired level. However, this could lead to a temporary reduction in output, which would exacerbate the inflationary problems, adding to political pressures towards re-controlling prices.
- Sell financial assets such as government bonds or increase deposit interest rates to absorb a part of the money held by the population and sterilize the proceeds (that is, not spend or give credit with the proceeds). But this would be expensive because the interest has to be paid. The selling of nonmonetary public assets such as houses, land, or enterprises is another option, which is regarded as most compatible with the desired direction of market reform. However, these processes would take a long time because of legal and technical problems.
- Undertake confiscatory monetary reform: either a forced conversion of currency, usually at unfavourable rates to existing moneyholders, or the blocking of bank accounts. Experience shows that this option is quite effective in dealing with monetary overhang. Moreover, the option may well be justified on income distribution grounds. So confiscation is often regarded as a favoured option. As will be seen in Section 2.2 below, this method was used in Vietnam, however with adverse consequences.

These methods will at best solve the stock problem but will leave the flow problem of public deficit untouched. The standard stabilization package of dealing with the flow problem is to cut back *both* kinds of deficits, namely, the government budget deficit

largely financed through money creation because of the absence of a well-established government securities market, and the deficit of the SOEs financed by cheap credit. Note that the focus on the budget deficit only may lead policymakers to miss another underlying cause of monetary expansion: the budget deficit could fall without resulting in a reduction of monetary expansion because of 'soft' credits extended to enterprises.⁸ Given the short-run limitation on raising revenue due to the collapse in output of the SOE sector and the weak tax system, a key aspect should be the reduction of government expenditure and here, the elimination of subsidies should be a high priority. At the same time, the easy-money policies of the central bank, in accommodating the insatiable demand for credit should be tightened. As Vocke (1948, quoted in Dornbusch and Wolf 1990) mentioned, 'soft measures do not create hard currency'.

2.1.3. Measurement of repressed inflation and the evidence from some CPEs

The traditional views based on the 'ideal-typical' model of a CPE, that a CPE exhibits pervasive, chronic macroimbalances and repressed inflation, are challenged by several other explanations related to money holding behaviour, both in theory and practice.

The Barro-Grossman disequilibrium model (1974) predicts that the effects of rationing in the goods market and price controls may also lead to a reduction in labour supply. The multiplier effect of this will further reduce output. As a result, the economy may move toward a constrained equilibrium at a lower level of income and

⁸The anomalous situation of high inflation with the budget in surplus had been experienced at some point by Poland and Yugoslavia (Tanzi, 1993).

employment (or labour effort). Another possibility, emphasized by Kornai (1980 Chapter 18) is 'forced substitution' of other goods for the goods in shortage. Moreover, the existence of micro-rationing and 'poor' information may lead consumers (and also economic units in MPEs like Vietnam in the 1980s) to hold larger amounts of cash by carrying around precautionary inventories of money to take advantage of opportunities to buy goods (Blanchard *et al* 1991, Hartwig 1983).

The greatest criticism is that the traditional analysis of a CPE does not include the increasing role of the 'parallel' market. The 'second economy' activities could eliminate both the macro- and micro-level disequilibria. A further point is that the range of financial and real assets that play the role as a store of value is broader than the traditional view assumes. These assets include, for example, foreign currency, gold and jewellery, and durable goods.

The view that there exist no pervasive disequilibria in the CPEs is supported by some theoretical analyses that take into account the role of the parallel market. Stahl II and Alexeev (1985) used the model of optimizing behaviour to prove that with a parallel market in which individuals can trade commodities acquired through the official economy by queuing, an equilibrium of parallel market prices and waiting times exists; further, the equilibrium price is equal to the official price plus an implicit wage rate multiplied by the queuing time. By including the same kind of parallel market, the cash-in-advance model developed by Lin (1993) shows that there may be no monetary overhang in a CPE. The study by Lane (1992) also used a cash-in-advance model, but with a parallel market in which informal trade in both goods and foreign exchange is

common. The study suggests that equilibrium in household money holdings may be achieved despite shortage.

Given the importance of the problem of repressed inflation for the reform measures and the theoretical controversy associated with this problem, it is worth testing whether repressed inflation (monetary overhang) significantly exists in a particular country. The definition of repressed inflation suggests two main ways of measuring repressed inflation: one is directly related to the relationship between demand and supply; the other asks for disequilibrium in the money market. In both cases, the empirical findings are quite mixed.

The first method applies a disequilibrium framework consisting of the estimations of the household demand for consumption CD_t , the planner's supply CS_t , and the observed quantity of consumption Cob_t that satisfies the minimum condition: $Cob_t = \min(CD_t, CS_t)$. Then, repressed inflation exists if CD_t is significantly greater than CS_t conditional on the observation Cob_t .

Using disequilibrium-estimation techniques, Portes and Winter (1978), for example, rejected the hypothesis of sustained excess demand in the market for consumption goods between the mid-1950s and mid-1970s in four CPEs (Czechoslovakia, East Germany, Hungary, and Poland). Similar conclusions have been drawn by Portes *et al* (1988) for Poland for 1955-80 and Van der Lijn (1989) for East Germany for 1957-85. But the estimation by Cottarelli and Blejer (1992) of the chronic overhang accumulated since the mid-1960s in the former Soviet Union suggests that the undesired holdings of wealth in this country at the end of 1990 amounted to about 20

percent of GDP and one third of existing financial assets. As a result, a price increase of 40-50 percent would have been necessary to wipe out these excessive monetary holdings.

The second common test for a repressed inflation problem is the estimation of the demand for money. The idea is quite simple. Because of the monetary overhang problem, the common assumption made for market economies that the money market tends to be in equilibrium, may not be appropriate for the CPEs. This means that the change in money supply could not be related systematically to the changes in scale variables and opportunity costs of money holding. Thus, if plausible specifications of demand functions fit very poorly, it might be suspected that we are not estimating a demand function at all and there could be significant monetary overhang and hence repressed inflation. Conversely, good fit and stability of a money demand function suggests that data are generated by this behavioural relation operating close to equilibrium, and there could not be a serious repressed inflation problem.

Recently, the study of household demand for money in Poland over the period from December 1979 to October 1988 by Lane (1992), has contradicted the view associated with the notion of a liquidity overhang. However, Feltenstein and Ha (1996), using quarterly data from 1980 to 1990, conclude that prior to 1991, there was strong evidence of considerable repressed inflation in Poland, whereas this was not the case for Czechoslovakia. The studies of the demand for money in China have also reached different conclusions about the significance of repressed inflation. Feltenstein and Farhadian (1987) conclude that during the period 1954-83, the true inflation rate was approximately 2.5 times the official inflation rate. Also, for part of the post-reform

⁹ See the main critiques in Cottarelli and Hojatz (1992).

period, when a dual price system existed in China, there was evidence to suggest that repressed inflation was important in that country (Feltenstein and Ha 1988). Nevertheless, the estimations, with quarterly data, for the period 1983-88 in the study by Burton and Ha (1990) provide indirect evidence against the existence of substantial repressed inflation.

Another useful way to determine the problem of monetary overhang is to calculate the velocity of money (or the money-to-income ratio). According to the identity, $V \equiv Py/M$ (where V represents the velocity of money, P the price level, y real income, and M the money stock), if there was a substantial increase in money supply relative to the output in the context of regulated prices, then the velocity of money would decline (or the money-to-income ratio would rise). For example, the decline in the velocity of money in China during the 1980s (Blejer *et al* 1991) and the increase in the ratio of household liquid assets to disposable income in the former Soviet Union from the 1970s to 1989 (Nordhaus 1990) may reflect the existence of repressed inflation. This method, however, is only suggestive⁹. In the case of an MPE, the dynamics of the velocity of money also correspond to the process of monetization, the expectation and credibility of government policies.

In summary, the analysis of the problem of repressed inflation should not be based only on the results of the 'pure' formal estimations. A consideration of the real behaviour of the economy, particularly the role of the parallel market and household saving behaviour, is necessary to convince us of the existence of repressed inflation.

⁹See the main critiques in Cottarelli and Blejer (1992).

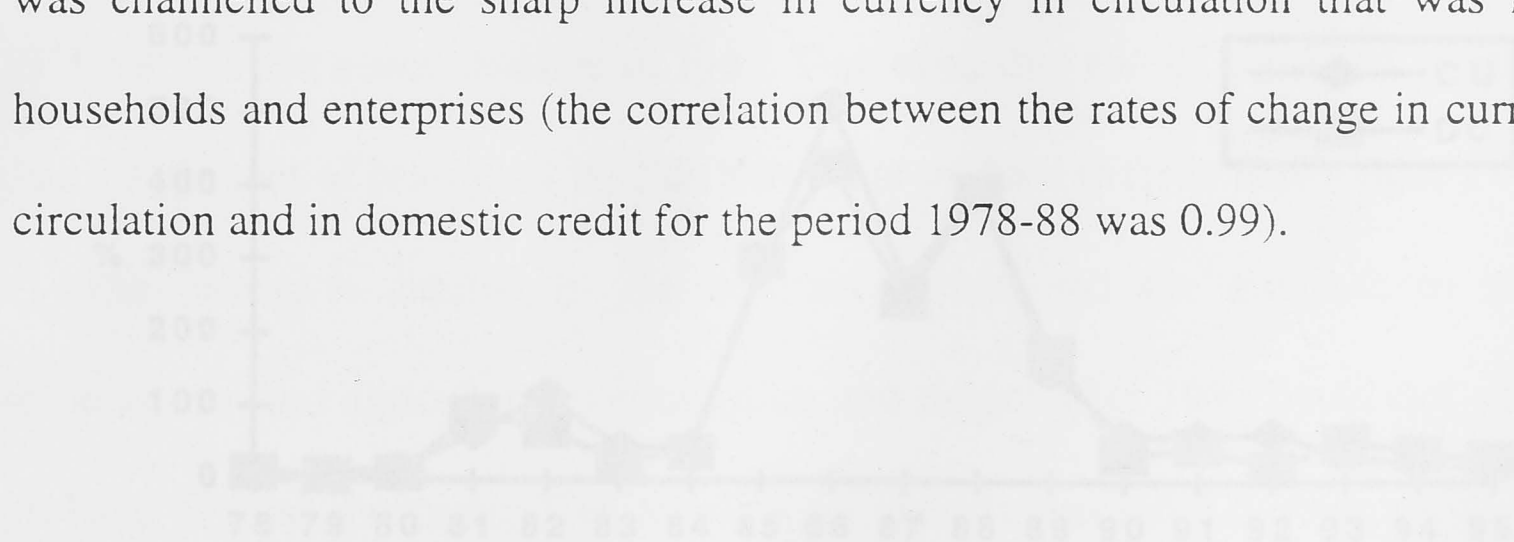
2.2. The Vietnamese experience

2.2.1. The empirical findings of repressed inflation in Vietnam

This section will first look at the causes that could lead to monetary overhang, namely, public finance and shortages in the consumer goods market. Then, to test the question of monetary overhang in the period before 1989, the demand for money and the velocity of money will be examined.

Figure 3 presents Vietnam's Government budget structure. As a percentage of GDP, the budget deficit was high throughout the 1970s and 1980s. It was in the range of 7-9% between 1977 and 1981, rose to 12% in 1985 and was still high at 7.2 and 7.6% in 1988 and 1989, respectively. Up to 1984, foreign assistance made up two-thirds of the revenue which financed the budget deficit. During the period 1985-89 more than 60 per cent of the budget deficit was financed by borrowing from the central bank. Note that the budget revenue had declined over time, from the end of the 1970s until 1988. One reason for this was the lower revenues from the SOE sector due to the difficulties this sector experienced under central planning during the period 1978-80 (see Chapter 1, Section 1.1). A second reason was the weak taxation system during the 1980s after the Three-plan system was adopted. Although revenue had constrained budget expenditure, subsidies remained at a high level, in the range of 3 to 5.3% of GDP during the period 1984-88 (World Bank 1992: 141).

At the same time, domestic credit expansion has accelerated since 1981. The increase was 90% in 1981, then rose to peak at 430% in 1986, before falling to 248% and 395% in 1987 and 1988, respectively (Figure 4). Given the passive, accommodating role of the banking system, and apart from the budget deficit source, the credit expansion was due to the 'hunger for investment' by the SOEs. As in any CPE, there was a strong tendency for managers to hoard inputs and to accumulate real assets so as to maximise output (regardless of cost), and to oppose acquiring financial assets because of very low interest rates. In the 1980s, the SOEs became more sensitive to 'price matters' and market demand, but demand for credit continued to be insatiable even though the plan targets were seen to be more realistic (see Table 3 below). One reason was that credit for the SOEs was heavily subsidized.¹⁰ Another reason relates to the Three-plan system. As the SOEs needed to acquire inputs on the free market for plans B and C, demand for working capital rose. The accelerating inflation, of course, made the problems of 'hoarding input' and demand for credit more serious. The credit expansion was channelled to the sharp increase in currency in circulation that was held by households and enterprises (the correlation between the rates of change in currency in circulation and in domestic credit for the period 1978-88 was 0.99).

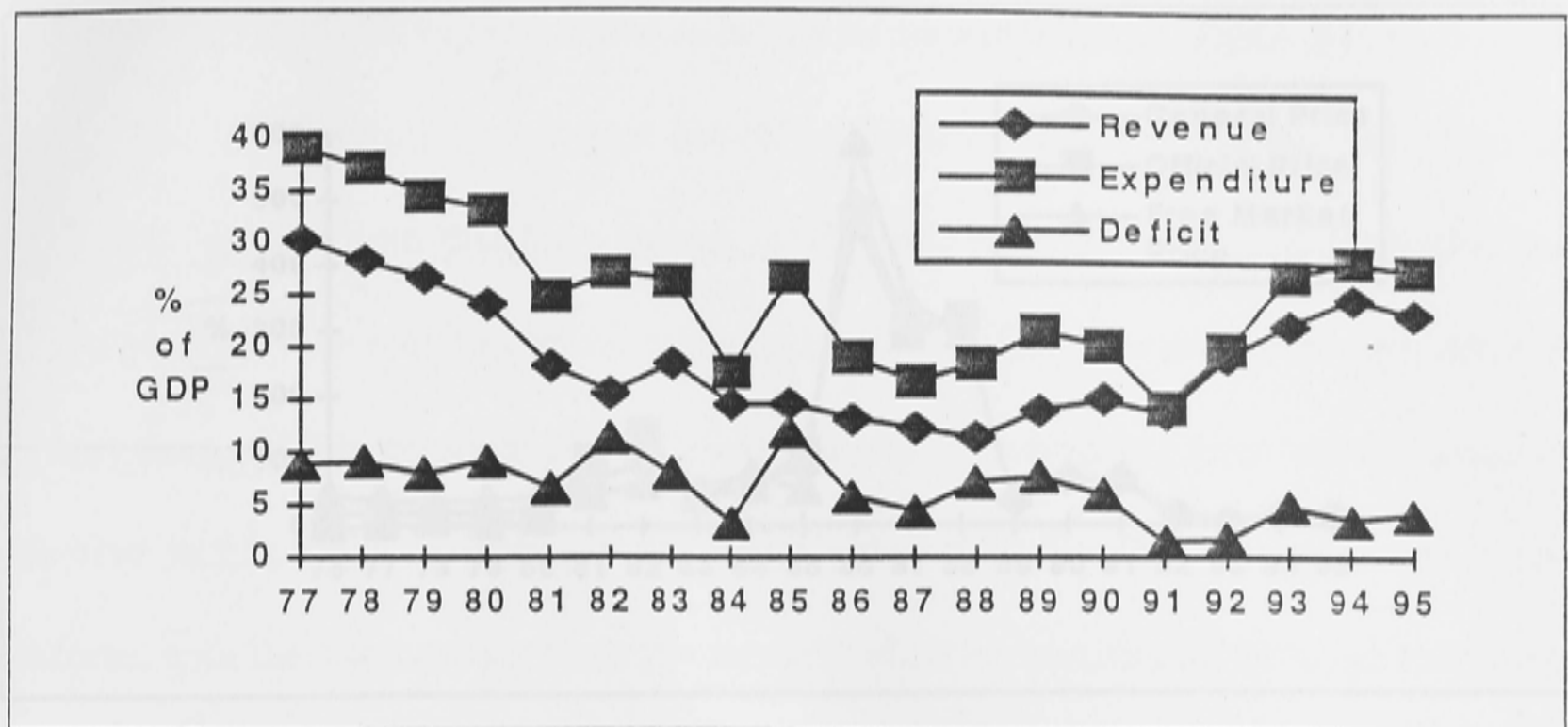


Note: CU- Currency in circulation, DC- Domestic credit

Source: For 1977-83, The estimates are based on the IMF data taken from Hsiao and Yeh (1982, Table 6.1, p. 125 and 6.2, p. 126) and IMF (1983, Table 11, p. 27); for 1986-88, World Bank (1994a, Table 4.1, p. 117); for 1989-93, World Bank (1994a, Table 1, p. 92). The correlation between the rates of change in currency in circulation and in domestic credit for the period 1978-88 was 0.99.

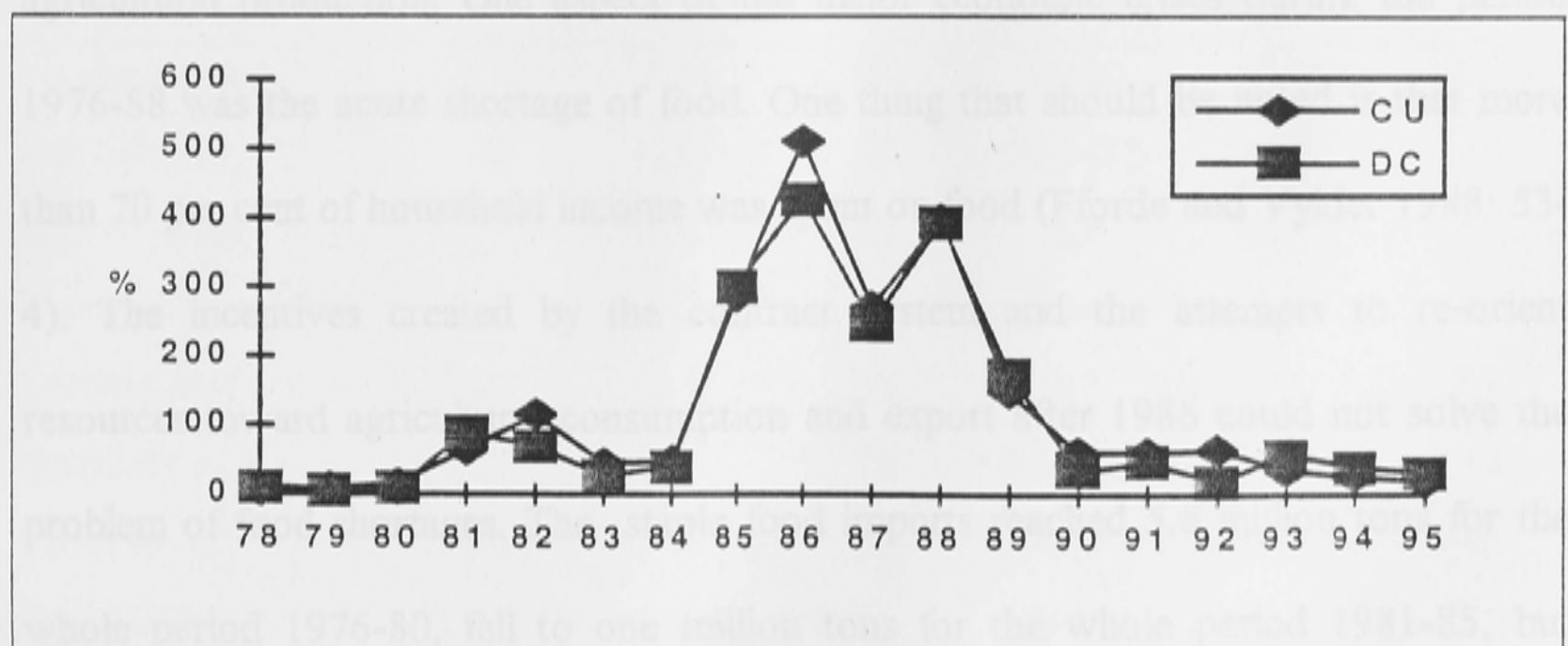
¹⁰For example, in early 1988, the rate of interest applied to credit for working capital was 1.8% per month whereas the monthly inflation rate was more than 14%.

Figure 3: Government Budget Structure (% of GDP)



Source: For 1977-83, the estimation is based on Kimura (1989 Tables 1-1 p.9 and 1-11, p.24) and GSO (1991 Table 12, p.18); for 1984-85, World Bank (1992, Table 5.1, p.141); for 1986-93, World Bank (1994b, Table 5.1, p.118). For 1994-95 (also in Figures 4 and 5), data are provided by the State Bank of Vietnam and CIEM.

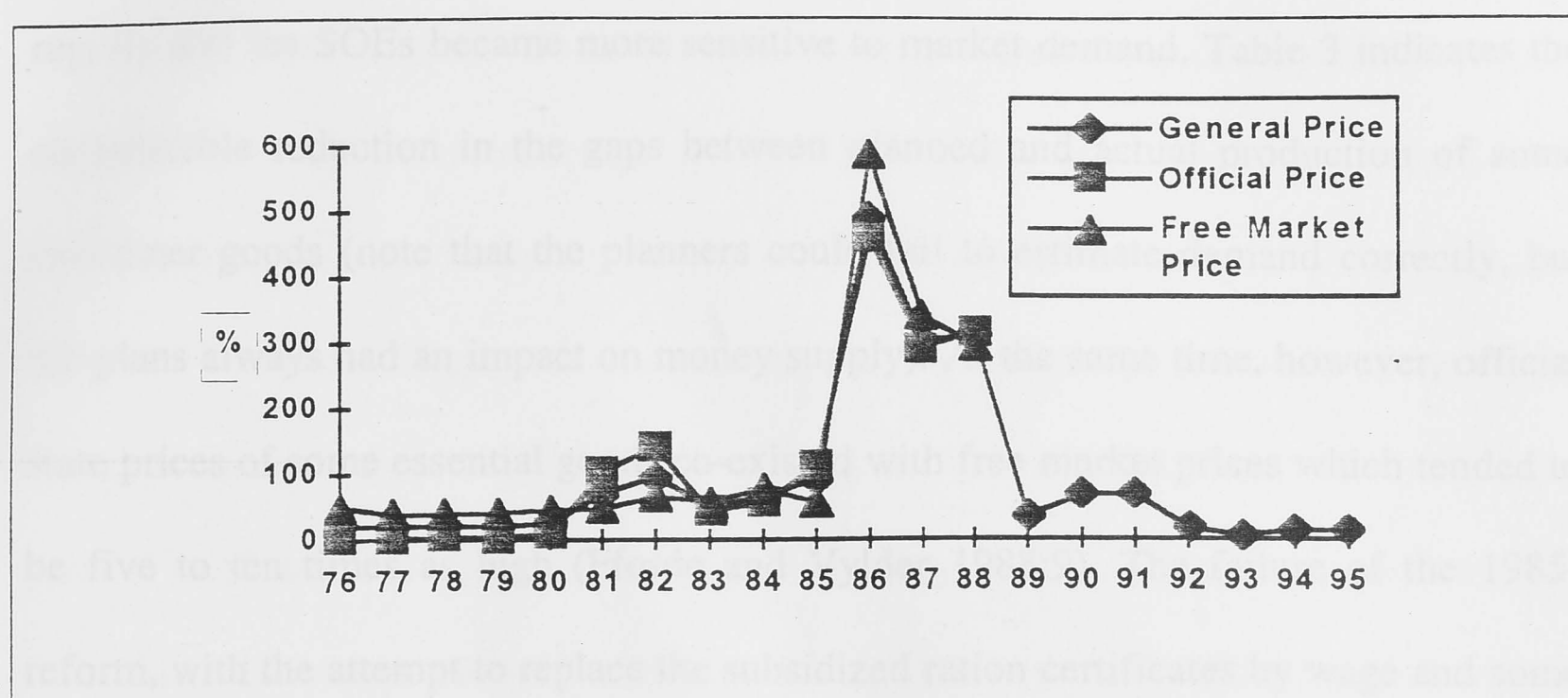
Figure 4: Cash in Circulation and Domestic Credit
(December-December Basis Change from Previous Year)



Note: CU- Currency in circulation; DC- Domestic credit

Source: For 1977-85, The estimation is based on the IMF data taken from Fforde and Vylder (1988, Tables 6.3, p. 135 and 6.5, p.139) and IMF (1983, Table 11, p.27); for 1986-88, World Bank (1994b, Table 4.1, p.117); for 1989-93, World Bank (1994a, Table 1, p.92). The 1985 data are adjusted for consistency between IMF and World Bank datasets.

Figure 5: Retail Price (December-December Basis Change from Previous Year)



Note: With the price reform in 1989, there is no longer any distinction between official and free market prices (The prices in parallel market)

Source: For 1976-88, World Bank (1992, Table 6.1, p.146); for 1989-93, World Bank (1994a, Table 2.1, p.4).

In general, the consumer goods market was also characterized by shortages that originated due to the heavy industry orientation at the expense of consumer goods and agricultural production. One aspect of the major economic crises during the period 1976-88 was the acute shortage of food. One thing that should be noted is that more than 70 per cent of household income was spent on food (Fforde and Vylder 1988: 53-4). The incentives created by the contract system and the attempts to re-orient resources toward agriculture, consumption and export after 1986 could not solve the problem of food shortages. The staple food imports reached 5.6 million tons for the whole period 1976-80, fell to one million tons for the whole period 1981-85, but increased again to about one million tons for each of the years 1986 and 1987 (Tran Trong Kim *et al* 1991:27 and Fforde and Vylder 1988:93).

The shortage of other essential goods was eased after 1980 as industrial output grew rapidly and the SOEs became more sensitive to market demand. Table 3 indicates the considerable reduction in the gaps between planned and actual production of some consumer goods (note that the planners could fail to estimate demand correctly, but the plans always had an impact on money supply). At the same time, however, official state prices of some essential goods co-existed with free market prices which tended to be five to ten times as high (Fforde and Vylder 1988:9). The failure of the 1985-reform, with the attempt to replace the subsidized ration certificates by wage and some other transfer payment increases, led again to the reintroduction of rationing for some basic necessities in 1986 and of some forms of control over the parallel market.

Table 3: Economic Plans and Performance, 1980 and 1985

| Industry | 1980 plan (1) | 1980 actual(2) | (2)/(1) % | 1985 plan (3) | 1985 actual(4) | (4)/(3) % |
|-------------------------|------------------|-------------------|--------------|------------------|-------------------|--------------|
| Foodgrain m.t | 21.0 | 14.4 | 68 | 19-20 | 18.2 | 94 |
| Sea fish m.t | 1.0 | 0.38 | 38 | 0.47-0.5 | 0.57 | 119 |
| Pigs m. head | 16.5 | 10.0 | 61 | 13 | 11.8 | 91 |
| Electricity bn.kWh | 5.0 | 3.7 | 74 | 5.5-6 | 5.2 | 89 |
| Cement m. t | 2.0 | 0.6 | 30 | 2.0 | 1.4 | 65 |
| Fertiliser m. t | 1.3 | 0.31 | 23 | 0.35-0.4 | 0.52 | 114 |
| Cloth m. m ² | 450.0 | 175.3 | 39 | 380-400 | 367.1 | 96 |
| Paper 000 t | 130.0 | 46.8 | 36 | 90-100 | 69.5 | 77 |

Source: Beresford (1989: 190)

The economy during the period before the 1989-reform is often described as a 'bureaucratic administrative-subsidy system' with aggravated shortages. As a result,

waiting lists, forced substitution, inventories above norm, rationing, and two-tiered prices, could be observed. Some economists believe that the economy exhibited both open inflation and *severe* shortage after 1981 (Kolodko *et al* 1992:116). Van Braban (1990b) believes that monetary reform in 1985 cut down sharply on the existing monetary overhang. There are, however, arguments against the existence of repressed inflation associated with monetary overhang in Vietnam (McCarty 1994). First, a parallel market had always played a significant role in the economy. Its share ranged from 44 to 60% over 1976-84 and from 24 to 34% over 1985-87.¹¹ Second, official prices followed the parallel market to some degree after the 1981-reform (Figure 5) and the very high inflation during 1985-88 could have eliminated monetary overhang. These arguments suggest that the problem of monetary overhang in the 1980s could have been quite minor. This proposition will be tested by the examination of demand for money and the velocity of money.

The estimation of the demand for money is based on the partial adjustment model (PAM) (see Appendix, Part A, for discussion of the use of PAM, the choice of the independent variables, and for the details of the estimation):

$$\log m_t = \text{const.} + c_1 \log y_t + c_2 z_t + c_3 \log m_{t-1} + u_t \quad (3)$$

Here $\log m_t$ is the natural logarithm of household deposits (*HD*), currency in circulation (*CU*), and narrow money (here $M1=HD+CU$) deflated by free market price indexes (denoted as $\log hd$, $\log cu$, and $\log m1$, respectively); $\log y_t$ is the natural logarithm of real national income indexes ($\log ni$); and z_t is the opportunity cost of holding money,

¹¹Since the General price index of Figure 5 is a weighted average of the Official and Free market indexes, it is possible to calculate the Free market share.

measured as $\tilde{\pi} = \pi/(1+\pi)$, where π is the inflation rate (the changes in free market prices).

The results of the estimation are presented in Table 4.

Table 4: The PAMs of Demand for Money

| Model | I (loghd) | II (logcu) | III (log ml) |
|----------------------------------|------------------------------------|------------------------------------|------------------------------------|
| Sample | 1978 - 91 | 1977 - 91 | 1978 - 91 |
| Constant | -14.427 (-3.817) ^{***} | -13.674 (-4.191) ^{***} | -14.377 (-4.167) ^{***} |
| logni | 2.644 (3.648) ^{***} | 2.391 (4.181) ^{***} | 2.603 (4.170) ^{***} |
| $\tilde{\pi}$ ($=\pi/(1+\pi)$) | -1.841 (-2.895) ^{**} | -0.663 (-1.821) [*] | -0.966 (-2.490) ^{**} |
| Lagged dependent variable | 0.476 (2.731) ^{**} | 0.351 (1.899) [*] | 0.348 (1.874) [*] |
| R-bar-squared | 0.776 | 0.836 | 0.835 |
| Overall F-test | F(3,9) = 14.850 ^{***} | F(3,10)= 23.127 ^{***} | F(3,9) = 21.251 ^{***} |
| S.E. of regression | 0.361 | 0.234 | 0.245 |
| <u>Diagnostic tests:</u> | | | |
| Autocorrelation $\chi^2(1)$ | 2.537 | 0.035 | 0.077 |
| Functional form $\chi^2(1)$ | 0.503 | 0.682 | 0.008 |
| Normality $\chi^2(2)$ | 0.006 | 0.071 | 0.975 |
| Heteroscedasticity $\chi^2(1)$ | 0.758 | 0.070 | 0.006 |
| Cusum-Sq test | pass | pass | pass |

Note: *, **, ***- significant at the 10%, 5% and 1% levels respectively. SE of regression is the standard error of the regression. The figures in parentheses are t-ratios.

Given the small number of annual data (14 or 15 observations), the estimations are quite *acceptable* in terms of the explanatory power, the other diagnostic tests, and the signs and significance of the explanatory variables. In particular, the demand for money responded well to the real income and the change in the inflation rates. The money market, thus, seemed to have been close to equilibrium. However, all monetary aggregates responded more significantly to income than to the opportunity cost variable and also, income elasticity was very high. In the case of demand for real *M1* and *CU*, the high income elasticity may indicate the following:

- First, this most probably shows the rapidly 'monetized' process of the economy under 'fence breaking' and the reforms since the end of the 1970s, as the coordination of economic activities increasingly took place through the free market.
- Second, the high income elasticities might reflect the very low ratios of money to income in Vietnam during that period. The ratios of *M1* to GDP during 1981-88 were below 10 per cent; the ratios of *M2* (defined as currency + deposits in Dong + deposits in foreign currency) were also very low by international standards prior to 1989 (Table 5).

Table 5: The Ratios of Monetary Aggregates to GDP (%)

| | 78-80 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 |
|--------|-------|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| M1/GDP | ≈14 | 8.4 | 9.2 | 8.3 | 7.9 | 9.9 | 7.8 | 9.2 | 15.2 | 16.4 | 13.5 |
| HD/GDP | ≈5.3 | 2.1 | 2.2 | 1.6 | 1.1 | 1.3 | 1.2 | 1.5 | 5.3 | 5.6 | 4.0 |
| M2/GDP | .. | .. | .. | .. | .. | 17 | 15 | 19 | 26 | 27 | 26 |

Source: For income, from the source indicated in Figure 1 (Chapter 1, Section 1.1) (Note: in the case of Vietnam before 1989, GDP is calculated with the ad hoc assumption of the proportions between NI and GDP); for nominal CU, as indicated in Figure 4; for HD, from IMF (1983, Table 11, p. 27), Fforde and Vylder (1988: 139), World Bank (1992, Table 1.1, p. 5); M2/GDP are taken from World Bank (1993, Table 4.1, p.242) and reestimated for 1989-91 (see also Table 9, Chapter 3, Section 3.2.2).

The above points apply to the case of insignificant involuntary money holdings. However, the very high income elasticity of money demand, particularly in the case of the estimation for household deposits (*HD*), may also reflect the rising degree of 'forced savings' associated with real income growth. Another test would therefore seem desirable. Here, the velocity of money is calculated as the ratios of national income to *M1* and *CU*. There is, however, no evidence of a long-term decline in the velocity of money during 1978-88 (Table 6). At the same time, the trend of the velocity of money is quite consistent with public perception: velocity rose sharply during 1981-84, consistent with falling credibility in the government's 'price' policy; the lower velocity after 1984 reflects the process of 'monetization', which was seen to be very rapid at that time. Then again, there was increasing lack of confidence associated with the rise in velocity during 1985-88 (For a detailed discussion of economic reform during the 1980s, see section 2.2.2 below). Perhaps only the market-oriented reforms in 1989 really gained public credibility.

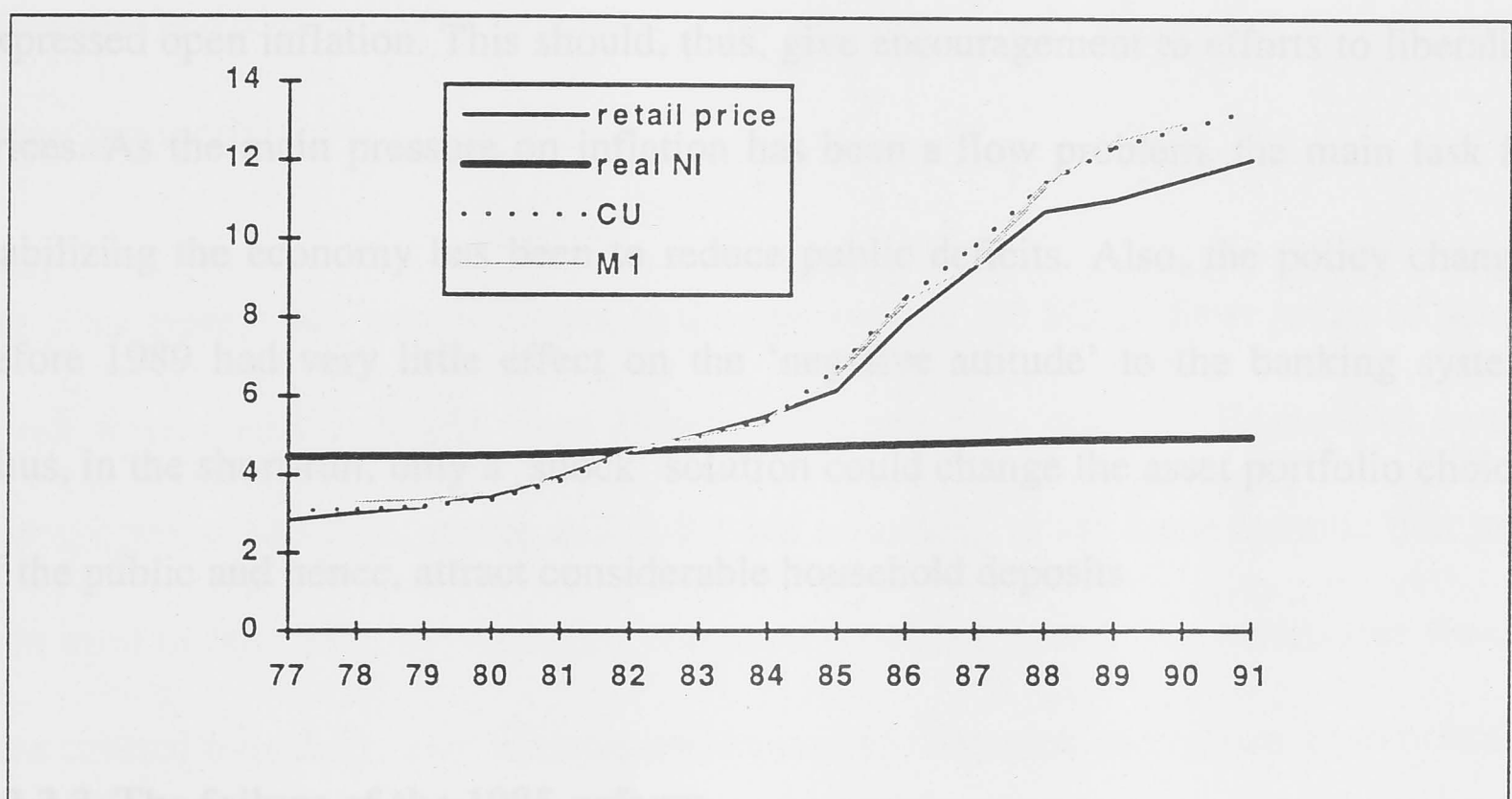
Table 6: Velocity of Money

| | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 |
|-------|-----|-----|-----|------|------|------|------|-----|-----|-----|-----|-----|
| NI/CU | 8.1 | 8.2 | 8.5 | 12.1 | 12.4 | 11.6 | 12.3 | 8.4 | 7.2 | 9.3 | 9.5 | 6.9 |
| NI/M1 | 5.1 | 5.1 | 5.3 | 8.5 | 9.3 | 8.8 | 9.8 | 7.3 | 6.2 | 7.9 | 8.0 | 4.5 |

Source: as indicated in Table 5.

Figure 6: Trends of Prices, Real National Income and Money

(Index numbers in natural log, 1982 = 100)



Source: For (general) retail price index, from the sources indicated in Figure 5; for other data, as indicated in Table 5.

Moreover, Figure 6 suggests that the increase in money supply was offset by the increase in prices. Also, the ratios of household financial assets such as *M1* or *HD* to income exhibit quite well the household savings behaviour. Throughout the 1980s prior to 1989, when real interest rates were negative, these ratios were very low compared to the period 1978-80 and since 1989 (see Table 5 above). This stable

savings behaviour is confirmed by the test for stability, which shows that the demand for deposits was rather stable with the only 'broken point' being in 1989. The savings behaviour indicates that the flight from domestic currency was important and the fact that in Vietnam, US dollars and gold have been widely hoarded as a specific safeguard of minimum financial standing and a reserve for the future.

On balance, the empirical case for the existence of significant monetary overhang and the associated repressed inflation throughout the period before the 1989-reform is not convincing. The analysis much more supports the notion that the economy had mainly expressed open inflation. This should, thus, give encouragement to efforts to liberalize prices. As the main pressure on inflation has been a flow problem, the main task for stabilizing the economy has been to reduce public deficits. Also, the policy changes before 1989 had very little effect on the 'negative attitude' to the banking system. Thus, in the short-run, only a 'shock' solution could change the asset portfolio choices of the public and hence, attract considerable household deposits.

2.2.2. The failure of the 1985-reform

The year 1985 was not the first time Vietnam introduced reforms related to prices, wages, and money. As a result of the microreforms in the agricultural and SOE sectors, official prices sharply increased in 1981 in order to narrow the disparity between official and free market prices. The government also devalued the currency (from 2.8 old Dong to 9.1 old Dong to one US dollar) and revised upward wages and salaries plus allowances. The result was inflation peaking at 65% and 92% in 1981 and 1982 respectively (Figure 5, Section 2.2.1). In the 'black' market, just after the

government's devaluation took place, the Dong fell from 37-40 to 60 to the dollar (Kimura 1989:43). In 1983 and 1984 the price and related reforms were reversed somewhat and there were attempts to strengthen planning control.

Certainly the 1985-reform was interesting since Vietnam for the first time tried to stabilise the economy and abolish an important part of the existing system of state subsidies. The major components of the 1985-reform included wages, prices, and money. Regarding wages, the aim was to abolish the rationing system and to replace consumer price subsidies by monetising in-kind payments. The higher wages with minimum levels were set to compensate for the drop in real wages and to encourage labour productivity.

The price reform was mostly related to the operation of the SOEs. State prices of many inputs were raised to levels more closely reflecting their scarcity. Enterprises could now set prices based on profits and costs, but according to the same formula that had been used in the CPEs: the cost-plus computation of fiat prices. The enterprises would have control over their own finance, and in capital formation enterprises would obtain credits from the banking system instead of relying on the budget allocation. However, aside from their function in setting fiat prices, the central planners continued to have control over salaries and the significant part of outputs and inputs (Van Braban 1990b).

Perhaps the most important element was monetary reform. Early 1985 saw the massive official devaluation of (old) Dong against the US dollar, from about 12 to 100 Dong to the dollar. But at that time the exchange rate in the 'black' market had already

depreciated to 350-370 Dong to the dollar (Kimura 1989: 54). Believing in the existence of *very 'excessive'* currency in circulation and attempting to control inflation so as to avoid a further drop in real wages as well as a collapse of the exchange rate, in September, the government implemented a kind of *confiscatory* monetary reform. The new Dong replaced the old at a rate of one to ten. Immediate exchange was, however, limited and the excess had to be kept at the State Bank for a substantial period of time. The main aim of this measure was to penalize the free market traders. In fact, however, the impact on private wealth seemed to be strongly blunted as the two weeks' advance warning allowed the marketeers to get rid of the old Dong and hoard gold and hard currencies. In contrast, this measure destroyed the Dong assets of the SOEs since they used cash widely to purchase scarce inputs (Jeffries 1993: 215). As a result, the government had to make up a cash shortage to keep SOEs in operation. At the time of the currency conversion, the new Dong exchange rate to the US dollar was fixed at an appreciated rate of 15 to 1, but the 'black' market immediately pushed the new currency down to 40-50 Dong and then to 115 Dong to the dollar (Kimura 1989: 55, and Le Dang Doanh 1992). There was little sign of public credibility in the reform.

In 1985, the government failed to cut off subsidies. Wages plus subsidies continued to rise as a percentage of GDP. The capital expenditure sharply increased to fulfil the five-year plan (1981-85), leading to a record deficit of 12% of GDP, about 60 per cent of which was covered by borrowing from the State Bank (Table 7). The drop in real wages due to high inflation forced the government to return to the rationing system as from 1986, and the subsidies rose again to substantial levels in 1987 and 1988. Due to the poor performance of the revenue from the SOE sector, the budget deficits were

high even with the reduction in capital expenditures. At the same time, the SOEs continued to face 'soft budget constraints'. Moreover, the increase in wages and salaries and in the prices of inputs created more reasons for the SOEs to bargain over cheap credits and over the contribution to the budget.

Table 7: Budget , Domestic Credits and Inflation, 1984-89

| Budget (% of GDP) | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 |
|-----------------------------------|------|-------|------|------|------------------|------|
| <i>Revenue</i> | 14.5 | 14.5 | 13.2 | 12.2 | 11.3 | 14.0 |
| -SOE Transfers | 10.5 | 11.2 | 9.5 | 9.2 | 7.2 | 8.1 |
| -Tax revenue | 3.1 | 2.3 | 2.9 | 2.2 | 2.9 | 3.9 |
| <i>Current expenditure</i> | 13.5 | 18.0 | 12.9 | 12.7 | 14.0 | 15.6 |
| -Wages & Salaries | 0.5 | 1.3 | 0.9 | 1.0 | 1.7 | 4.6 |
| -Subsidies | 5.2 | 4.7 | 2.9 | 4.9 | 5.3 | 0.0 |
| <i>Capital expenditure</i> | 4.1 | 8.2 | 5.9 | 3.9 | 4.4 | 5.8 |
| <i>Primary balance</i> | -3.1 | -11.8 | -5.7 | -4.3 | -7.0 | -7.3 |
| <i>Interest</i> | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 |
| <i>Overall balance</i> | -3.3 | -12.0 | -5.8 | -4.4 | -7.2 | -7.6 |
| <i>Financing</i> | 3.3 | 12.0 | 5.8 | 4.4 | 7.2 ^a | 7.6 |
| -Foreign | 2.3 | 4.9 | 2.2 | 1.4 | 2.4 | 1.5 |
| -State Bank | 0.6 | 7.1 | 3.6 | 2.9 | 2.9 | 6.9 |
| -Gov't securities | 0.3 | 0.0 | 0.0 | 0.1 | 0.1 | -0.8 |
| Domestic credit (%-change) | 41 | 301 | 429 | 248 | 395 | 175 |
| - Gov't (net) | .. | .. | .. | 321 | 736 | 370 |
| - SOE sector | .. | .. | .. | 221 | 355 | 111 |
| - Other & Private ^b | .. | .. | .. | 347 | 235 | 95 |
| Inflation (%) | 65 | 92 | 487 | 301 | 308 | 35 |

Note: a- arrears = 1.7; b - Before 1992 most credits had gone to the cooperative sector

Source: For budget structure, World Bank (1992, Table5.1, p. 141); for domestic credit and inflation , see Figures 4 and 5 (Section 2.2.1).

The predictable outcome of the budget and the SOE situation was a rapid increase in domestic credit and as a result, soaring inflation to unprecedented levels during 1985-88 (see also Figures 4 and 5, Section 2.2.1). The rampant inflation had not only destroyed liquid wealth again, but also undermined real wages and the effectiveness of the public sector. It also destroyed the effectiveness of the contract system in agriculture. Food production stagnated, and this also contributed to the acceleration in inflation.

The severe consequences of the 1985-reform were the failure to stabilize the economy. The government had failed to deal with the *flow* problem - the public deficits, while it had exaggerated the *stock* problem- the monetary overhang, which led to unnecessarily strong measures of confiscatory monetary reform. The failure, of course, had originated in the attempts to control the economy in the manner of the CPEs while the economy increasingly exploited the free market channels. The lack of credibility in the government policies on the part of the public also undermined the process of stabilization.

2.2.3. The success of the 1989-reform

The failure of the efforts to stabilize the economy until 1989 and of the last attempts to control the free market during the period 1985-88 showed that there was no way for Vietnam to return to the previous managerial system. In March of 1989, Vietnam enacted a radical reform that sought to combine stabilization with strong moves toward a market economy (Dollar 1994, Lipworth and Spittaller 1993, World Bank 1993).

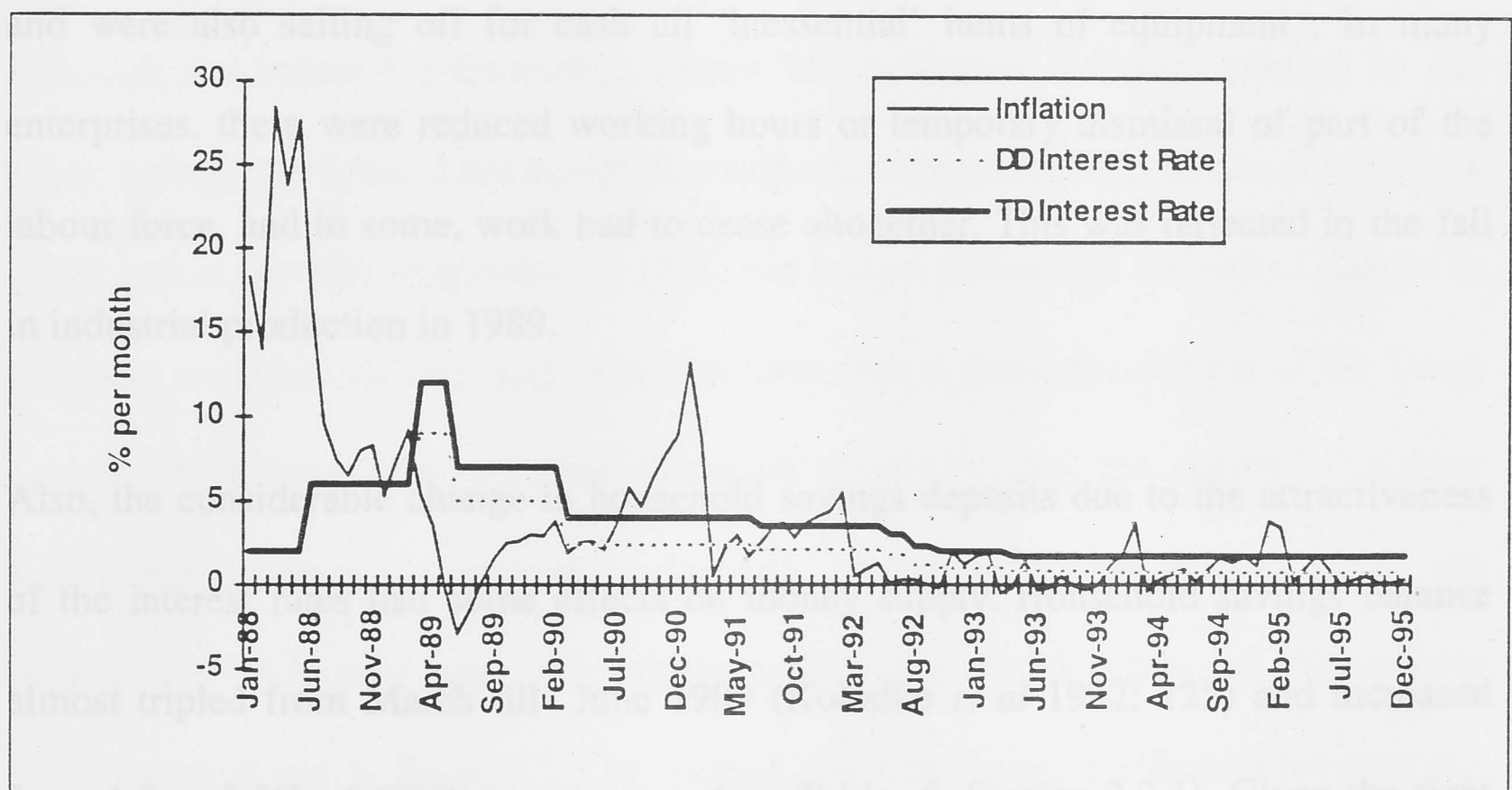
Budget and monetary policies played a fundamental role in the stabilization package. The budget constraint for the SOE sector, which up till then had to take into account all market prices for cost-profit accounting, was hardened by stopping direct subsidies and by allowing the interest rate on loans to the enterprises to become positive in real terms, although lower than the interest rate paid to households. The household demand deposit rate during 1989 yielded real interest rates at an extremely high level (Figure 7). The real interest rate for three-month deposits was 113 per cent over one year, from March 1989 till March 1990 (Kolodko et al 1992: 129).

Several measures in favour of a market environment were also adopted. Most prices were liberalized, formally abolishing the distinction between 'official prices' and 'free market prices'.¹² The exchange rate was sharply devalued and was unified to a single official exchange rate at the level of the parallel market, implying a fivefold increase in the price of foreign exchange (from 900 to 4500 Dong for one US dollar). The state monopoly in the gold trade was abolished and market trading in gold was legalized. In the new environment, the SOEs have been given full autonomy in their pricing, production and investment decisions. According to Vietnamese economists, most enterprises have been assigned only one target, namely 'contribution to the state budget' (Jeffries 1993: 214). In rural areas, the collective system was largely dismantled and agriculture returned to family farming on the basis of long-term leases. After years of discrimination against the private sector, the government reversed course and began to encourage this sector. Also the first steps towards liberalizing foreign trade and attracting direct foreign investment were taken.

¹²The only exceptions were the prices of electricity, oil, cement, steel, and transportation, but even these prices were adjusted and thus better reflected operating costs.

It is remarkable that Vietnam showed strong growth in 1989 (and through the adjustment processes as mentioned in Chapter 1). Reforms in 1989 brought an initial surge in output growth of the agricultural sector (6.9%) and services (17.6%), which offset the loss in industrial output (4%) and as a result GDP increased 8% (World Bank 1994a: 4). But the success of the reforms was particularly impressive in the area of combating inflation. As can be seen in Figure 7, the monthly inflation rate declined from 28% in March of 1988 to slightly negative rates in the summer of 1989. For the whole year, inflation was 34.7% compared to several hundred per cent during the period 1986-88 (see also Figure 5, Section 2.2.1)

Figure 7: Monthly Inflation and Deposit Interest Rates



Note: TD interest rate = Time deposit interest rate (Time deposits are mainly in three or six months), DD interest rate = Demand deposit interest rate; before March 1989, there was only one interest rate for household savings deposits.

Source: Dang Duc Dam (1995a, Table 1.27, p.155), GSO(1994, Table 72, p. 98) and World Bank(1992:2). Updated data have been provided by the CIEM.

Although there are no monthly or quarterly data for the budget and money supply for 1989, there is no doubt that the fiscal and credit policies had been firmly tightened at least in the first three to four months after the reform was announced in March, and this was the decisive factor for reducing the inflation rate. What could be observed are the adverse effects on the SOE sector of the policy changes (Wood 1989). Many SOEs were not able to pass the higher costs on to customers, and the sharp reduction in profits (and hence cash flow) led to a shortage of working capital. This was because there were no longer budgetary grants for working capital and the level of interest rates for loans was high. Few enterprises felt that profitability would be great enough to cover the cost of borrowing at these rates. The anecdotal evidence showed that the SOEs (especially those in difficulty) were doing everything to reduce physical stocks and were also selling off for cash all 'inessential' items of equipment. In many enterprises, there were reduced working hours or temporary dismissal of part of the labour force, and in some, work had to cease altogether. This was reflected in the fall in industrial production in 1989.

Also, the considerable change in household savings deposits due to the attractiveness of the interest rates had some effects on money supply. Household savings balance almost tripled from March till June 1989 (Kolodko *et al* 1992: 125) and increased from 1.5 to 5.3% of GDP over the year (see Table 5, Section 2.2.1). Given the tight monetary policy at that time, it seems that these proceeds were partly sterilized, that is, not spent or given as credit.

In order to alleviate the difficulties of the SOE sector, in the second half of 1989 the monetary restraint was relaxed somewhat. In line with the substantial drop in interest

rates on bank deposits after June 1989 (from 12 and 9% in March to 7 and 5% for time deposits and demand deposits, respectively, see Figure 7), the interest rates on loans were deliberately reduced below deposit rates with a maximum rate of 3.9% per month (GSO 1994:98). For long-term loans the rate was only 0.8% per month. Regarding the budget, the current expenditure associated with the payments for laid-off workers and reductions in 'army size', and also for capital expenditure, were excessive. In 1989 the budget deficit was 7.6% of GDP, more than 90 per cent of which was financed by the State Bank. As a result of the relaxation of monetary policy and the budget deficit, domestic credits increased 175% for the year 1989 (Table 7, Section 2.2.2). In August, inflation re-emerged and monthly inflation was running at 2.5-3.0 per cent during the last three months of 1989 (and most of the first half of 1990) (Figure 7).

Although the inflation phenomenon cannot be understood without referring to the public deficits, the latter is not completely sufficient to explain the situation in 1989 as a whole and in the following years. In 1989, the budget deficit and the rate of change in domestic credits were very high, and also there was a sharp devaluation of the Dong against US dollars while inflation decreased sharply.¹³ Also, the degree of positive association between the changes in domestic credits and inflation rates during the period 1989-95 is very weak, quite different from the period before the 1989-reform (see Figures 4 and 5, Section 2.2.1). Indeed, the correlation coefficients between the rates of change in domestic credits and in retail prices are 0.884 for the period 1978-88 and 0.047 for the period 1989-95.

¹³Kolodko *et al* (1992) raised some questions concerning this phenomenon.

Apart from the other factors that could help reduce inflation, such as the increase in competition and in total output, one possible explanation of the somewhat paradoxical phenomenon in the inflationary movement is the large change in the asset portfolio choices made by the population. The phenomenon of Vietnam in 1989 seems to be similar to the closing months of hyper-inflationary episodes in the study by Sargent (1982), who found that the end of hyper-inflation is often characterized by falling inflation rates despite the fact that the money supply continues to grow at a rapid pace. Sargent notes that this only occurs as individuals exchange gold, foreign exchange or other assets for domestic money. He argues that once individuals come to believe the government's fiscal reform and commitment to stabilize the economy, the central bank could be sure that the increase in money supply is all demanded by the public and so will be non-inflationary.

The year of 1989 is one example with substantial evidence of the portfolio shift out of dollars and gold into domestic currency. The demand for US dollars and gold suddenly declined. The nominal exchange rate remained relatively stable after March 1989 until mid-1990 when consecutive devaluations occurred. Before the reform, the gold price was almost twice as high as the world price at free market exchange rates. It was stabilized at a level lower than the world price throughout most of 1989 (Kolodko *et al* 1992: 133). Household deposit saving behaviour was substantially altered in 1989 as the stability test for the equation of demand for real household deposits suggested, and the substantial change in household deposits into the banking system is further evidence of this point.

Thus, the government's success in stabilizing the economy in the year of 1989 as a whole was a combination of fiscal and monetary restraint as well as the asset portfolio choices of the people in favour of Dong in response to the market-oriented reforms that were set in train. The confidence of the people in the fundamental changes to policies enabled the government to ease credit conditions without re-igniting inflation.

Summary

This chapter examines the theory of the financial system in CPEs, in which central control over money supply is at best indirect and incomplete. With the accommodating and passive role of the monolithic state banking system ('monobank') and the 'soft budget constraint' facing the SOE sector, the economy tends to suffer from increasing 'repressed' inflation because of the public deficits (the 'flow' problem), in addition to the 'monetary overhang' (the 'stock' problem). It is argued that, as a result of microeconomic reforms undertaken in the early 1980s resulting in significant parallel markets in Vietnam, there was no serious 'stock' problem during the 1980s before the 1989-reform. However, there was a very serious 'flow' problem due to the monetization of the budget deficit and the deficits of SOEs.

Despite the efforts to stabilize the economy, the 1985-reform failed. This is because the government applied strong measures in the form of confiscatory monetary reform to deal with an insignificant 'stock' problem, while the 'flow' problem remained untouched and became even more serious. The focus on the 'flow' problem made a decisive contribution to the sharp reduction in inflation, at least in the first half of 1989. As prices were liberalized, there was no doubt that control over the public

deficits associated with the change in domestic credits and hence money supply would continue to play an important role in the process of stabilizing the economy. But this 'flow' problem is only a necessary, not a sufficient condition for explaining the inflationary movement. The evidence in 1989 showed that the asset portfolio choice by the population is a factor which cannot be ignored in understanding inflationary movement. The interaction between macroeconomic policy initiatives and this type of structural change since 1989 is the subject of research in the following chapters.

3.1.1. Financial structure and reform

As mentioned in Chapter 2 (Section 2.1.1), prior to 1990, the Vietnamese banking system remained consistent with the model in a centrally-planned economy: the primary task of the State Bank of Vietnam (SBVN) was to provide all banking services in accordance with the national plan. In mid-1988, Vietnam took the initial steps towards establishing a two-tier banking system by transferring the commercial banking functions of the SBVN to the new state-owned commercial banks (SOCBs). In practice, however, the two-tier system did not function as intended since the SBVN remained very much part of the state bureaucracy.

Only in 1990 did the new laws on banking (the 'Decree on the State Bank of Vietnam' and the 'Decree on Banks, Credit Co-operatives and Finance Companies') authorize the SBVN to assume traditional central bank functions such as the conduct of monetary policy and the supervision of the financial system. To a large extent, commercial banks took over from the SBVN the functions of deposit and lending vis-à-vis households and enterprises. Sectoral restrictions on specialized banking activities and barriers to entry for new competitors and foreign banks were abolished. At

Chapter 3

Monetary Control and Inflationary Movement

in the Aftermath of the 1989-reform

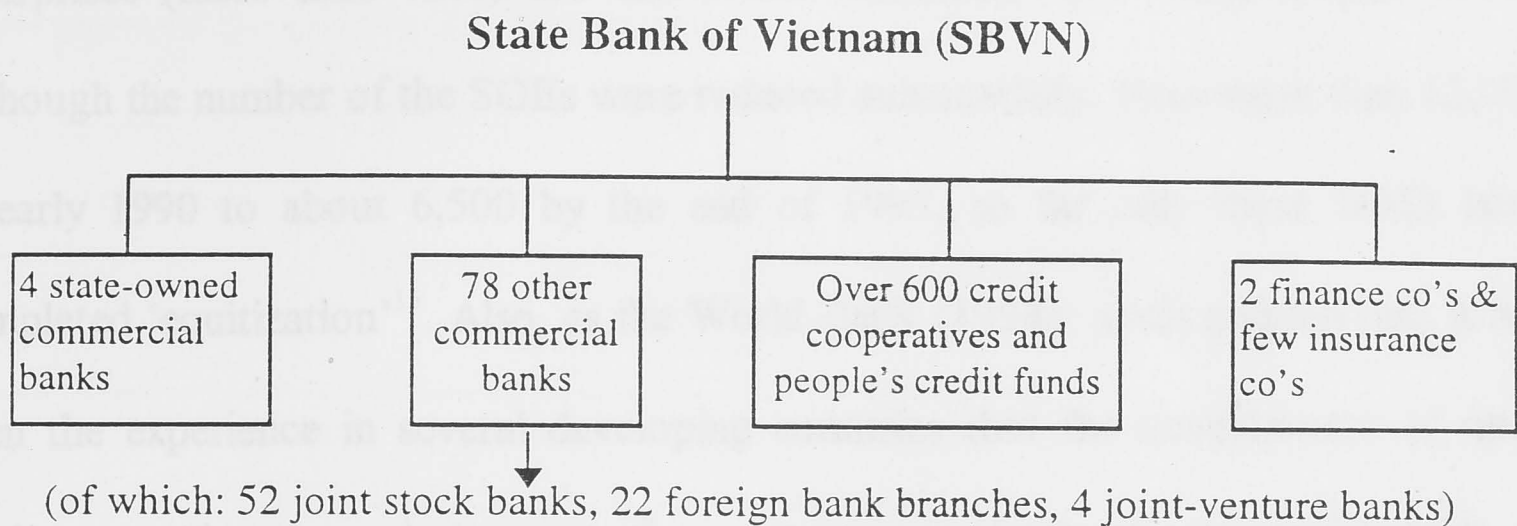
3.1. Financial structure and monetary control

3.1.1. Financial structure and reform

As mentioned in Chapter 2 (Section 2.1.1), prior to 1990, the Vietnamese banking system remained consistent with the model in a centrally-planned economy: the primary task of the State Bank of Vietnam (SBVN) was to provide all banking services in accordance with the national plan. In mid-1988, Vietnam took the initial steps towards establishing a two-tier banking system by transferring the commercial banking functions of the SBVN to the new state-owned commercial banks (SOCBs). In practice, however, the two-tier system did not function as intended since the SBVN remained very much part of the state bureaucracy.

Only in 1990 did the new laws on banking (the 'Decree on the State Bank of Vietnam' and the 'Decree on Banks, Credit Co-operative and Finance Companies') authorize the SBVN to assume traditional central bank functions such as the conduct of monetary policy and the supervision of the financial system. To a large extent, commercial banks took over from the SBVN the functions of deposit and lending vis-a-vis households and enterprises. Sectoral restrictions on specialized banking activities and barriers to entry for new domestic and foreign banks were abolished. At

present, in addition to the four SOCBs¹⁴, there are in operation a number of shareholding banks, credit cooperatives/funds, joint-venture banks and foreign banks (see diagram).



Source: Leung (1997)

Since 1990, the reform measures have granted a greater degree of autonomy and independence to all levels of the banking system. The banks have begun to modernize their internal systems and have gradually improved services, for example, the payment systems within and between major cities. In 1995, larger companies and thousands of private customers had cheque-accounts, and credit cards appeared on the market. The Vietnamese banks have also taken the first step towards integrating into the international payment system by joining the Society for Worldwide Interbank Financial Telecommunication and the Master Card and Visa Card payment systems. Vietnam began issuing T-bonds and T-bills in 1992 in order to cover the budget deficits. Following the first auction of domestic treasury bills in June 1995, a limited market in securities has developed between banks. The first treasury bond issue on the international market was launched in 1996. The government is developing a securities market, which it hopes will be in place by 1997-98.

¹⁴ Four SOCBs are the Bank for Foreign Trade of Vietnam (Vietcombank), the Bank for Investment and Development of Vietnam (BIDV), the Industrial and Commercial Bank (Incombank), and the Vietnam Bank for Agriculture (Agribank).

However, there are at present only a few private companies owned by shareholders. By the end of the first-quarter of 1995, there were 20,102 registered private enterprises, but only 1.8% of these are shareholding companies. Most of the private enterprises (more than 72%) are one-owner businesses (Le Dang Doanh 1995). Although the number of the SOEs were reduced substantially, from more than 12,000 in early 1990 to about 6,500 by the end of 1995, so far only three SOEs have completed 'equitization'¹⁵. Also, as the World Bank (1994a: xviii) pointed out, it has been the experience in several developing countries that the development of open market operations as an instrument of monetary control can take five to six years, as developing the needed secondary market for government paper is a slow process. Therefore, development of an efficient securities market will take some time. Hence, in the foreseeable future, the financial system will be overwhelmingly dominated by the banking sector. There are, however, several challenges facing the banking system.

In spite of the growing number of domestic and foreign banking institutions, there is little competition in the financial sector. This is not only because of government restrictions, but also because the combination of reserve requirements, turnover taxes, and profit taxes makes financial intermediation unprofitable (World Bank 1994b). The longer-term solution for real competition, however, depends on understanding the role of the SOCBs in the new economic environment. At present, it is stressed in Vietnam that the SOCBs should play a 'leading role' in the banking sector. As can be seen from Table 8, the sector remains dominated by the SOCBs, which account for about

¹⁵The government expects to turn about 2% of the SOEs into shareholding companies in 1996 and 1997 (*Economic Development Review* No 22, June 1996).

90% of the total assets of all commercial banks. Also, the SOCBs are still biased against the non-state sector. While the non-state sector accounts for about two thirds of GDP, its share in total credit was only 36% by the end-1995 (*Economic Development Review* No 22, June 1996).

Table 8: Structure of the Financial system

| <u>Components</u> | Assets | Assets | Assets | Number of branches (1995) |
|--|--------------------------|--------------------------|--------------------------|---------------------------------|
| | 31/12/89 Dong (trill) | 31/12/93 Dong (trill) | 31/12/95 Dong (trill) | |
| SBVN | 5.27 | 32.0 | .. | 53 |
| SOCBs | 7.26 | 35.1 | 43.3 | 800 |
| Others | 0.22 | 3.7 | 5.1 | |
| Assets of commercial banks (% of GDP) | 26.6 | 28.4 | 21.0 | |

Note: Other institutions: for 1989: shareholding banks, urban and rural credit cooperatives; for 1993: shareholding banks, joint-venture banks and foreign banks branches; for 1995: as for 1993 plus credit cooperatives. Among the SOCBs, the Agribank has 56 provincial and 500 district branches.

Source: To Dinh Thai (1996), World Bank (1994a: 9 and 1991: 18) and the estimation by the author.

More importantly, in many aspects, the SBVN and SOCBs continue to operate in a monobank mode, despite their greater autonomy. In reality, the autonomy of the SBVN remains constrained by the government and the SBVN has continued supplying loans, making payments or transferring money on behalf of institutions outside the financial sector. The SOCBs remain large, public institutions, dependent on the SBVN for subsidized funds. In the case of non-performing loans, the interest due is covered by new loans and by direct SBVN transfers via the SOCBs to the SOEs. In fact, this

treatment involves subsidies to the SOEs and may give an inaccurate view of the tightness of fiscal policy (Lipworth and Spittaller 1993)¹⁶. Also, the SOCBs still operate in segregated parts of the economy, despite the fact that they are authorized to act as full service 'universal' banks. For example, over 90% of Agribank loans are to the agricultural sector; the Vietcombank has continued dominating the market for foreign exchange transactions (World Bank 1993 and Roman 1995).

At present, Vietnam is a 'underbanked' country. The level of the total assets of all commercial banks in 1993 was well below that of other countries in Asia (World Bank 1994a: ii) and declined considerably in terms of GDP (Table 8). Most of the other banks, apart from the SOCBs, have very few branches- just 1-2 each. There is also the problem of access to the banking system. It is estimated that the banking system serves only 7% of the population. The survey 'Assessment of firm responses to the new economic environment' conducted at the end of 1994 by Vietnam's State Planning Committee and Japan's Overseas Economic Cooperation Fund, showed that a majority of enterprises saw limited access to finance as their most serious impediment.

To measure the degree of financial intermediation, one can look at an indicator of financial depth. The ratio of M2 to GDP increased significantly from 19.4% in 1988 to 26.4% and 27.2% in 1989 and 1990 respectively, but declined somewhat during 1991-93. In 1994-1995, the ratio stood at a level of about 30% (see Table 9 in Section

¹⁶ The banking system has around 5-6 trillion Dong of nonperforming assets (of which 95% are held by the SOCBs and 65% are owned by the SOEs) or well over 25% of outstanding loans and twice the capital and reserve of the banks. The recorded amount is probably an underestimate of the level of nonperforming assets, since it does not include estimates of substandard or doubtful assets (World Bank 1994a:vii). In 1995, Vietnam invited Coopers & Lybrand to audit the Agribank- the weakest of the four; the audits of other SOCBs were to follow (Reuter News Service, July 1995).

3.2.2 below). According to the World Bank (1989:27), average M2/GDP ratios for three groups of developing countries - high, medium, and low growing economies - were around 43, 31 and 23 % respectively for the years 1965-87. Thus, while the Vietnamese economy has grown fast, financial intermediation in Vietnam is still less advanced than in the medium-growth developing countries. Also, cash in circulation to M1 (M2) is between 60 and 79% (30 and 43%) for the period 1989-95. These figures are very high in comparison with ASEAN countries and are much higher than in most transitional countries (World Bank 1994a: 12). This means that Vietnam is still very much a cash economy.

The lack of public confidence in the formal financial system is a serious problem. Despite high real interest rates for time deposits, large financial savings still remain outside the banking system in the form of foreign currency, gold, and precious metal. The value of US dollars circulating in Vietnam is estimated at about 2-5 billion (see, for example, Ngo Huy Duc 1996 or Dodsworth *et al.* (1996)). A number of reasons can be listed. One is the historical legacy of a monobank system that is not geared to serve individuals. Another is the collapse of several credit cooperatives in 1990-91. Still other reasons are claimed to be related to the deficient payment system and cash management that result in unacceptable delays in effecting financial transactions or making cash withdrawals (Roman 1995). The recent widening of the current account deficit may have caused anxiety about the adequacy of official foreign exchange reserves and of macroeconomic management more generally. All these factors would have also contributed to a lack of public confidence.

¹² Although the number of SOEs has been reduced substantially, they are still managing 88.4% of the country's total capital and their output share rose during 1989-94 from 25% and 65% to nearly 30% of GDP and 72% of industrial production, respectively (Economic Development Review No.21, June 1996 and Dodsworth *et al.* 1996, Tables 3.1p.42 and A.7p.45).

A consequence of the weaknesses of the banking system is the development of a significant informal financial sector that consists chiefly of two types of activities. The first is transactions in parallel currency markets that mainly meet demand for foreign exchange for legal and illegal imports and portfolio diversification. The portfolio motive seems to be particularly strong in Vietnam as the hyper-inflationary experience in the mid-1980s and the relatively high inflationary episode in 1990-91 still affect the credibility of the banking system. The second type of informal financial activity is (short-term) loans given for various investment and consumption purposes by money-lenders, friends or relatives.

Although the size of the informal financial sector is very hard to measure, there is no doubt that this sector plays a very important role in financial intermediation in Vietnam. It is an established fact that US dollars are widely used and kept by the population. A survey of hundreds of small to medium-sized private enterprises in 1995 shows that about 78% of these enterprises borrowed from the informal sector (To Dinh Thai 1996). In rural areas, more than 70% of households have taken loans from the informal sector, which, in turn, has captured about 70% of the total loan market (World Bank 1994a: 72).

From the point of view of conducting monetary policy, the examination of the existing financial environment has some important implications. First, given the large SOE sector¹⁷ and the importance of the relationship between this sector and the government, and the still limited independence of the state-owned banks, there exists

¹⁷ Although the number of SOEs has been reduced substantially, they are still managing 88.4% of the country's total capital and their output share rose during 1989-94 from 25% and 66% to nearly 30% of GDP and 72% of industrial production, respectively (*Economic Development Review* No22, June 1996 and Dodsworth *et al* 1996, Tables 3.1,p.12 and A.7,p.45).

the potential for monetary expansion without rigorous control. It is essential that the 'quasi-fiscal' deficit be part of the accounting of the consolidated government. (Quasi-fiscal deficits can arise from loans by the state-owned banks at subsidized rates and losses on foreign exchange operation in the form of guarantees). Also, the government may be faced with the so-called 'asymmetry problem' in the implementation of monetary policy. That means that once the stock of money is already expanded, it is not easy for the government to contract the money supply (Yung Chul Park 1973). This is because the tightening up of credit could have a contractionary impact on the public sector. And this may not be desirable from the government's point of view.

Second, the inflationary movement may not only be sensitive to the change in money supply, but also affected by the financial portfolio choice of the public in terms of the shifts between domestic and foreign currencies. The portfolio choice, in turn, depends very much on the expectation and credibility of the government policies. A preliminary consideration in Chapter 2 (Section 2.2.3) shows that this was the case in 1989. The World Bank (1994b) also suggested that one factor in explaining low inflation despite an increase of 59% in domestic credit in 1993 was that a substantial part of the rapid increase in credit to the private sector was offset by unrecorded contraction of activities in the informal sector. Since the 'informal' financial activities can significantly undermine monetary control, one important way to relieve the possible negative impact of the informal sector on monetary control is to create easier access for the private sector to the banking system (especially to the SOCBs in the case of Vietnam).

Third, because of the lack of development in the financial sector, in Vietnam as in many developing countries, most of the traditional monetary instruments are subject to certain technical limitations. This problem will be outlined in Section 3.1.2 below.

3.1.2. Monetary control and the instruments of monetary policy

In the past, within the framework of a centrally-planned economy or modified-planned economy, the SBVN became the interface between the state budgetary process and SOEs, ensuring the flow of financial resources in accordance with the national plan. The SBVN had, in fact, no control over the money supply, and the economy was prone to inflationary pressures, kept in check only through price control and rationing (Chapter 1).

The reform of the financial sector has changed the role and the functions of the SBVN. In principle, the SBVN has the authority to control monetary growth to meet targets for inflation and real economic growth, and has been responsible for the supervision and regulation of the financial system. The method of monetary control has improved in recent years. The SBVN has been using a monetary programming framework, that is, determining a monetary target consistent with projections of net foreign assets, credit to the government, and credit to the economy (World Bank 1993). Also, by introducing a nascent government bill market, Vietnam has taken initial steps to develop open market operations as an effective indirect tool of monetary management. Some other more market-based measures such as the auction

of refinancing lines as well as the use of contracts allowing the sale and repurchase of some commercial papers at an agreed price, are also under consideration.

It should be stressed, however, that the monetary targets have been established by the Council for Monetary Policy and Banking, which is headed by the Minister of Finance and includes other ministers as members, in addition to the SBVN governor. As a result, the board of directors of the SBVN has been performing more the role of an advisory committee than that of a decision-making board. Also, at present, the banking inspection body is directly responsible to both the governor of the SBVN and the government's General Department of Inspection.

At present, the lack of development in the financial structure is also a serious institutional factor that limits the effectiveness of most monetary instruments available to the monetary authority. This can be seen from an examination of the money supply determination and the instruments and measures used by the SBVN to control the stock of money.

By using the following definitional equations:

$$M=CU+D, \quad H=CU+BR, \quad br=BR/D, \quad \text{and} \quad cd=CU/D$$

where M is stock of money, CU is currency in circulation,

D is deposits in commercial banks,

H is monetary base or high-powered money, and BR is bank reserves,

we can easily derive the supply function for money

$$M = \left(\frac{cd + 1}{cd + br} \right) H = kH \quad (4)$$

where $k = (cd+1)/(cd+br)$ is the money multiplier.

Since cd (the currency-deposit ratio) reflects the behaviour of the public, br (the reserve-deposit ratio) reflects the behaviour of the commercial banks (and other financial institutions), and H reflects the behaviour of the central bank, the money supply is determined by the interaction of all these agents.

In Vietnam, as in many other developing countries, the cd ratio depends on income, the deposit interest rates, the expected exchange rate, the interest rate in the informal financial sector, the degree of monetization, and the development of the formal financial system. Four main factors determine the br ratio: the uncertainty of net deposit inflow; the cost of borrowing from the central bank when a commercial bank runs short of reserves; the loan interest forgone by holding reserves; and the required reserve ratio. The br ratio would depend very much on the reserve requirement (and credit ceilings) established by the central bank, since commercial banks are likely to expand their loans to the maximum level permitted by their reserve assets.

High-powered money H is defined as the monetary liabilities of the central bank. The components of H are (net) central bank credit to the government, central bank credit to the commercial banks and central bank net holdings of foreign assets. Foreign exchange reserves are influenced primarily by the fluctuations in capital flows. Hence the monetary authorities would have little direct control over this source, given the commitment to a pegged exchange rate regime. The control over the other two

sources, to a large extent, depends on the degree of independence of the central bank. In Vietnam, although the law sees the SBVN as a distinct body, the close link of the SBVN to the government and the SOCBs that dominate the banking system, reduces the ability of the SBVN to control the monetary base.

In general, most determinants of the money supply are essentially endogenous to government interventions. The central bank can still control the stock of money only if it implements effectively various monetary instruments and measures. At present, the SBVN exercises monetary control through three policy instruments: interest rates on both deposits and loans, central bank refinancing, reserve requirements, and other measures such as informal or formal advice regarding bank lending policies and credit ceilings, in the aggregate and on a bank-by-bank basis (World Bank 1994a).

Up to now, interest rates on deposits and loans have been controlled directly by the SBVN through regulations. In fact, the SBVN determines and announces publicly the minimum deposit rate and the maximum loan rate to be used by credit institutions. In practice, banks maintain all interest rates at the prescribed levels. The interest rate policy, however, has radically changed since 1989 with the linking of interest rates to the inflation index. The rates on time deposits and loans, except during 1990-91, have become positive in real terms, and banks have been able to eliminate the previous negative spread between their deposit and lending rates.

Deposit interest rates (3-and 6-month) have begun to play a role in the mobilization of short-term financial resources and in the increase in demand for domestic currency. One should mention that virtually all savings deposits in Vietnam are short-term. In

1992, the prescribed sector-specific lending rates were abandoned and instead, the lending rates were differentiated only according to the loans for fixed or working capital. However, the lending rates reflect very weakly credit risk premia and terms of maturity since the interest rate on fixed-capital is lower than that on working capital. These factors have been discouraging longer term lending by the banking sector.

Together with interest rate policy, (aggregate) credit ceilings are regarded as part of direct monetary controls¹⁸. These ceilings are broken down into ceilings for individual banks. This implies that each bank faces the same restriction in terms of the maximum credit growth rate allowed. Thus, while some banks may hit the ceiling, others may not be restricted by it. In Vietnam, bank-by-bank credit ceilings have been used since 1994 and were first imposed only on the four SOCBs. However, currently 22 additional banks (mostly urban joint-stock banks) are covered by the ceilings; foreign and joint venture banks remain entirely exempt from ceilings.

The main advantage of direct controls is their effectiveness in controlling intermediate targets such as credit growth or interest rates. Also, direct instruments are considered less complicated for the central bank to implement than indirect instruments. Nevertheless, direct instruments have a number of inter-related drawbacks. As with all non-market-based methods, direct controls risk misallocation of resources and hamper competition and, therefore, development of the banking system. Furthermore, they

¹⁸ There exist several types of credit ceilings: selective credit controls, gross ceilings, and credit ceilings that take into account the inflationary impact of credit creation. Note that, the distinction between direct and indirect monetary instruments is, however, not always clearly defined. These two concepts have a number of definitions, one of which is that direct instruments take the form of regulations, while indirect instruments work through markets. That is why, for example, although reserve requirements are generally considered as an indirect instrument, they carry characteristics associated with direct instruments in the form of regulation (see Hilbers 1993).

may lead to excess liquidity in the banking system, when demand for capital is high (Hilbers 1993). This is particularly so when high deposit interest rates come together with tight credit ceilings. A credit 'glut' was experienced in Vietnam at the end of 1994-early 1995 and in the first half of 1996 (Vu Ngoc Nhung 1995 and *Vietnam Investment Review* No 249, 22-28 July 1996).

In order to develop an efficient financial system, therefore, the use of indirect monetary instruments should be encouraged. But up to now, both the central bank refinancing and reserve requirements that are often regarded as indirect instruments, have been implemented inefficiently.

With regard to refinancing policy, the SBVN provides two facilities: short-term and longer-term lending to banks. The rates charged for short-term lending are lower than the (maximum) lending rates prescribed for the banks' own lending to their customers. This encourages banks to use the SBVN as a source of funds for onlending to their customers. The second facility (longer-term refinancing to banks) is now also supposedly available to all commercial banks, but in practice, it mainly benefits the SOCBs. Moreover, the longer-term refinancing rates are in the range of 85 to 95% of the interest rates charged by banks to their customers. Thus, both facilities represent cheap access to SBVN credit and hence contain inflationary potential. It seems that, at present, the SBVN is finding it difficult to encourage banks to lend long-term; therefore it is subsidizing this type of loan through 'cheap' refinancing rates. The threat to macroeconomic stability should be the main reason for finding solutions other than central bank subsidies.

Under the SBVN statute, minimum reserve ratios may fluctuate between 10% and 35% of a bank's total deposits, including foreign deposits. The effective reserve requirements for all banks, however, ranged from 6% to 9% at the end of 1993 and were even lower in 1991 and 1992. Also, the penalty on shortfalls has been rarely enforced. In 1994, the SBVN prescribed separate reserve requirements for demand and time deposits, including also banks' holdings of T-bills. A justification for the differentiated reserve requirement is the experience of some developing countries, which require commercial banks to hold a minimum of certain prescribed liquid assets in order to prevent the use of alternative ways of acquiring reserves (for example, by liquidating banks' holdings of government securities). But the effectiveness of the new system of reserve requirements has been in question. The World Bank (1994a) even saw this as 'a regressive step', given the capability of the banks to collude with customers to change the categories of deposits, the limitations of staff expertise in defining the procedures of banking transactions and the fact that T-bill holdings only change the composition and not the volume of credit, and hence the new step will weaken its monetary policy impact.

As the high-powered money, H , in Equation (4) has a (net) foreign asset component, the control of the money stock depends also on foreign exchange management. In a small open economy with a fixed exchange rate and capital mobility, the monetary authorities have very weak control over the high-powered money. After exchange rate unification in 1989, Vietnam was classified as a country with a managed-floating exchange rate regime¹⁹. This could give more scope for an independent monetary

¹⁹In 1991, the SBVN established two foreign exchange trading centres, dealing with US dollars, in Ho Chi Minh City and Hanoi. The participants include commercial banks, the companies with authorized

policy. For various reasons (eg., control of inflation, reduction of the effects of capital inflow on competitiveness), the SBVN would intervene in the foreign exchange market as in recent years. But care needs to be taken for two reasons. First, official reserves are still low. At the end of 1995, these reserves were about US \$900 million, or just equal to about 12% of total import in 1995. Second, the market for government securities is not well-developed to allow for sterilization on a large scale. The intervention, thus, may undermine the monetary growth target.

To sum up, the implementation of credit ceilings, at present, is an easier tool for the SBVN to restrain credit growth. As the economy becomes more open, together with other monetary instruments, exchange rate management can also play an important role in the control over the money supply. Together with the continuing process of financial reform, there is obviously room for improvement of monetary instruments and measures.

3.2. A statistical consideration of inflationary movement

3.2.1. The causes of inflation

The question of the causes of inflation has been at the centre of the monetarist/structuralist debate since the 1960s and 1970s (Kirkpatrick and Nixon 1976, Crockett 1981). The monetarist view sees the causes of inflation (and balance of payments) difficulties in the excess of aggregate demand associated mostly with monetary expansion, over aggregate supply. This view often interprets inflation as a

access to international markets and institutions which hold licences for receiving payments in foreign exchange (Brahm 1992).

purely 'monetary phenomenon', ie inflation cannot continue for long without monetary expansion. Inflation stabilization, therefore, can be approached only by restraining aggregate demand. The 'monetarist' solutions - the removal of fiscal deficits, the restraint of credit, and the elimination of market distortions (especially the establishment of an 'equilibrium' rate of exchange)- have formed the basis of IMF-sponsored stabilization programs. However, as Barro(1982) pointed out, it should be realized that the 'monetary phenomenon' refers not only to movements in the quantity of money but also to factors that influence the public's willingness to hold money.

Although structuralists do not deny the 'monetary' nature of inflation in the long-run, they contend that demand restraint could be reflected in the short run mainly in a drop in domestic output due to structural rigidities and bottlenecks in the pattern of production and demand. Policy, thus, should focus on removing supply bottlenecks and other structural rigidities, so that output capacity can be raised, and therefore, excess demand reduced.

The debate over the inflation problem indicates the complexity of the problem. As Crockett (1981) pointed out:

'Inflation is a complex interactive process in which the level of aggregate demand and the economic structure (including the structure of expectation) within which that demand operates, both play important roles. Over the long run, inflation can persist only if the monetary authorities continually permit nominal demand to rise faster than real supply... But when the structure of the economy is such that certain economic agents have substantial market power, or when inflationary expectations have become firmly entrenched, pressures on prices can persist for a long time even

when conventionally used indicators show no overall excess demand. The existence of strong inflationary expectations increases, at least in the short run, the degree of monetary restraint required to achieve a given moderation of those pressures. And in the longer run, structural factors, as even monetarists would agree, determine the intensity of factor use that is consistent with price stability'.

The interaction of the factors causing inflation can be seen from two simple formulas for inflation rate which can be derived either from the equilibrium condition in the money market or from the formula of money supply and the definitional equation for monetary velocity. Both these formulas will be shown since they form the basis for analyzing the inflation problem and for building most theoretical and econometric models of inflation.

In the first case, the supply of real money balances $(M/P)^s$ equals the demand for these balances $(M/P)^d$.

$$\left(\frac{M}{P} \right)^s = \left(\frac{M}{P} \right)^d \quad (5)$$

Taking the natural logarithm and differentiating with respect to time will give us

$$\pi = gM - D_t \log \left(\frac{M}{P} \right)^d \quad (6)$$

where π is the inflation rate, gM is the growth rate of nominal money supply, D_t is the differentiation operator with respect to time, showing the rate of change in real demand for (domestic) money.

To obtain another formula for the inflation rate, we suppose that cg is flow of (net) central bank credit to cover a 'monetized' part of the government budget deficit and cb is central bank credit to commercial banks. (In a broader sense, cg can be understood as credit to the public sector; then cb is credit going to the private sector). Here cg and cb are all measured as a percentage of GDP. In the case without central bank intervention in the foreign exchange market, $cg+cb$ reflects entirely the change in high-powered money, H . For simplicity, we assume also that the money multiplier k in Equation (4) is stable. In other words, the change in total money supply M is determined only by the change in H . Therefore, by denoting P as the general price level and y as real output, we can obtain

$$\frac{\dot{M}}{kPy} = \frac{\dot{H}}{Py} = cg + cb \quad (7)$$

where a dot over a variable (for example, \dot{M}), indicates the rate of change (dM/dt).

But monetary velocity V is defined as $V = Py/M$, so by taking the natural logarithm and differentiating with respect to time, we can obtain

$$\frac{\dot{M}}{M} = \frac{\dot{P}}{P} + \frac{\dot{y}}{y} - \frac{\dot{V}}{V} = \pi + n - \frac{\dot{V}}{V} \quad (8)$$

where π is the inflation rate and n is the growth rate of real output.

Using (7) and (8) will give us

$$\pi = kV(cg + cb) - n + \frac{\dot{V}}{V} \quad (9)$$

As monetary velocity can be considered a linear and increasing function of the inflation rate (Mundell 1971), $V = \alpha + \beta\pi$, where α represents the noninflationary level of velocity and $\beta (> 0)$ is the responsiveness of velocity to the inflation rate, it is possible to derive the formula of the determination of the inflation rate in a steady state ($\dot{V} = \dot{\pi} = 0$):

$$\pi = \frac{k\alpha (cg + cb) - n}{1 - k\beta (cg + cb)} \quad (10)$$

Since the budget deficit g can be financed in three ways: with high-powered money through central bank credit to the government cg , domestic bonds b , or foreign debt f , where g , b and f are also measured as a percentage of GDP, we can rewrite Equation (10) as:

$$\pi = \frac{k\alpha (g - b - f + cb) - n}{1 - k\beta (g - b - f + cb)} \quad (10')$$

Both Formulas (6) and (10) show that inflation is the result of several factors. Because of the increase in money supply and its underlying causes as the monetization of fiscal deficit and central bank credit to commercial banks, there is inflation. Evidence from a number of inflationary experiences (including the case of Vietnam) shows that they have common internal causes, notably large budget (public) deficits which run to an expansion of money and credit. Moreover, the dynamics of inflation are broadly the same (Bruno *et al* 1991 and Dornbusch 1992). At the same time, the ability to cover

the budget deficit by domestic or foreign debt can directly contribute to a reduction in inflation (Formula (10'))²⁰.

But given the change in money supply, inflation rates can differ widely, depending on the supply side, real demand for domestic money, which in turn depends on the financial structure, and expectations. Both Formulas (6) and (10) indicate the benefit from a reduction in the inflation rate due to strong economic growth (In (6), there will be higher demand for real balances). In other words, there is room for the provision of additional money without introducing the risk of inflation. As β in Formulas (10) and (10') represents the responsiveness of velocity of money holdings to the inflation rate (and therefore, usually reflects the rate of change in the flight from domestic currency), the public credibility of an anti-inflation program is very important from the policy point of view. For example, in an environment where there is accelerating dollarization (β is increasing, so is π), the scope for an inflation tax is very limited. A more detailed examination of the possible factors explaining demand for money, which thus effect inflation (Formula (6)), is undertaken below.

According to the Keynesian approach, real money demand depends positively on the level of real income or real wealth and depends inversely on the (bond) interest rate which measures the opportunity cost of holding money. According to Friedman (1956), money, like any other asset, yields a flow of services to the person who holds it. That is why money is directly substitutable with both financial assets and real assets

²⁰ To see these effects, one can take partial derivatives of the inflation rate to corresponding variables. For example, $\partial\pi/\partial cg = (k(\alpha + k\alpha\beta - \beta n))/(1 - k\beta(cg + cb))^2 > 0$ since βn is very small in comparison to α .

(such as physical capital and real durables).²¹ The measure of the opportunity cost of holding money should be based on the income to be earned from possessing these other assets. Moreover, the principle of the diminishing marginal rate of substitution between money and other assets ensures that, if the return on any of these other assets rises, the demand for real balances will fall. Thus, the problem of defining an appropriate money demand function, together with the choice of a real income variable, is to pick out the relevant variables to measure the opportunity cost of holding money.

In developing countries, particularly in those with the experience of high inflation and an under-developed capital market, both physical assets (like durable goods) and foreign currency (for example, US dollars) are usually the principal assets that can be substituted for domestic currency. For durable goods, the rate of return is the expected rate of inflation. The rate of return on foreign currency in terms of domestic currency is often measured as the (expected) rate of depreciation (see, for example, Calvo(1992) and Choudhry(1995)). Implicitly, this assumes that the public can only keep foreign currency in hand rather than keeping it as an interest-earning foreign exchange account in a bank.

Some countries with a high degree of currency substitution, however, have allowed the banking system to hold US dollar deposits for residents (Rodriguez 1993). Moreover, these countries usually also have an active interest rate policy so as to make domestic currency more attractive. In this case, the domestic economy may function as

²¹ The dividing line between the Keynesian and Friedmand (monetarist) model of the demand function for real balances is drawn in terms of the extent to which money is directly substitutable for other assets.

if it operated under high capital mobility. The residents can deposit dollars and/or, if the transaction costs are negligible because of rather free exchange between domestic currency and dollars, can change dollars into domestic currency to deposit in the local banking system. Thus, the deposit interest rate on dollars (i_{fc}) or the deposit interest rate on domestic currency minus the expected depreciation rate ($i_d - \varepsilon^e$) could be used as a measure of the opportunity cost of holding dollars in hand, depending on which is higher²². Note that an increase in $i_d - \varepsilon^e$ means a rise in demand for domestic currency.

The above consideration implicitly assumes that there is only a one-way effect from the right-hand-side variables in (6) and (10) on inflation. In fact, the problem of inflation determination is much more complicated since these variables can be affected by inflation and can have an interrelationship. The empirical studies support the proposition that high inflation has a negative impact on output growth (Barro 1995, Dornbusch and Reynoso 1989, and Fischer 1993). The public expectation of the variables determining the opportunity cost of holding money, such as interest rates, expected inflation rate and exchange rate, is strongly affected by current inflation rates. In turn, the coefficient β in (10) depends obviously on this expectation. Also, the anti-inflationary effects of the rise in foreign and/or domestic borrowing may be partly reinforced /offset by a change in β . An increase in inflation will also result in a

²²This is implied from the so-called parity condition: $E_0/E_1(1+i_d) = 1+i_{fc}$, where E_0 and E_1 are exchange rates at initial and end periods of depositing money, or $\varepsilon^e = (i_d - i_{fc})/(1+i_{fc}) = i_d - i_{fc}$, or $i_{fc} = i_d - \varepsilon^e$. Note that people's financial portfolios depend also on the loan interest rates in the informal sector, which are usually higher than official deposit interest rates. But the risks are also much higher. Moreover, the choice of an appropriate informal interest rate is not simple because of the lack of data and the segmentation of the informal market. In the case of Vietnam, anecdotal evidence suggests that the portfolio choice by the public is mostly affected by the official deposit interest rates.

fall in real budget revenue because of collection lags (the Olivera-Tanzi effect), thereby possibly widening the budget deficit (Choudhry 1990). Moreover, the central emphasis on money creation as an exogenous variable in the inflation process has not gone unchallenged (Dornbusch 1987). The 'Balance of Payments School' held the view that balance of payments difficulties, associated with repatriation payments, gave rise to exchange rate depreciation, which in turn led to inflation and monetization.

A rigorous investigation of the inflation problem, therefore, requires support from the more sophisticated techniques (eg. a broader dynamic model and/or an econometric investigation). However, the Formulas (6) and (10), that reflect quite well the main ideas of the causes of inflation, provide a good guide for a preliminary assessment of the inflationary experience in Vietnam or any developing/transitional economies.

3.2.2. The Vietnamese experience: A statistical consideration

It is clear from Table 9 that the much higher inflation rate during 1989-91 in comparison to that during 1992-95 was associated with the higher growth rate of money supply (in terms of currency in circulation, M1, or M2). This pattern seems to be consistent with the monetarist explanation of inflation. Thus, better monetary control and fiscal management could have been the important factors in inflation control during the period of 1992-95.

In recent years, as mentioned in Section 3.1.2, the SBVN has used different monetary instruments, such as interest rates, central bank refinancing, reserve requirement and

credit ceilings, to control money supply. In particular, credit quotas have been quite an effective instrument in avoiding excessive credit growth.

Table 9: Some Financial Indicators (1989-95) (%-change, otherwise indicated)

| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 |
|---|-------|-------|-------|--------|------|------|-------|
| Budget balance (% GDP) | -7.6 | -5.9 | -1.5 | -1.7 | -4.7 | -3.6 | -4.2 |
| Money supply M1 | 53.9 | 79.0 | 58.6 | 46.3 | 31.6 | 20.8 | 23.0 |
| - Currency | 129.6 | 58.8 | 71.8 | 69.7 | 35.5 | 26.4 | 20.0 |
| Money supply M2 | 188.8 | 53.1 | 78.8 | 33.7 | 27.2 | 51.2 | 33.1 |
| - Domestic credit | 175.0 | 36.4 | 44.1 | 19.9 | 58.6 | 40.2 | 32.6 |
| Inflation (by CPI) | 34.7 | 67.5 | 67.6 | 17.5 | 5.2 | 14.4 | 12.7 |
| Seigniorage (% of GDP) | .. | 5.6 | 3.2 | 6.0 | 2.5 | 4.0 | 3.7 |
| Monthly average nominal interest rates on Dong: | | | | | | | |
| - demand deposit | 6.15 | 2.75 | 2.45 | 1.63 | 0.83 | 0.70 | 0.70 |
| - time deposit | 8.06 | 4.41 | 3.75 | 2.86 | 1.70 | 1.70 | 1.70 |
| Nominal depreciation rate | .. | 59.09 | 93.98 | -15.89 | 0.00 | 1.71 | -0.41 |
| Real exch. rate (89=100) | 100 | 97.0 | 126.7 | 88.2 | 86.2 | 77.5 | 69.8 |
| Financial depth (M2/GDP,%) | 26.4 | 27.2 | 26.4 | 24.6 | 25.3 | 29.6 | 30.1 |
| Currency/M1 (%) | 65.7 | 58.3 | 63.2 | 73.3 | 75.5 | 79.0 | 77.1 |
| Currency/M2 (%) | 31.7 | 32.9 | 31.6 | 40.1 | 42.8 | 35.7 | 32.2 |

Note: -The estimation is based on the data measured from December to December

- M1 = Currency in circulation + demand deposits; M2 = M1 + time deposit + foreign currency deposits. In Vietnam, M2 is often referred to as total liquidity.

- Seigniorage is measured as the change in high-powered money

- The estimation for the real exchange rate is based on the formula $Re = (EP^*)/P$ where E =nominal exchange rate, P^* =US price level, and P = domestic price level. Declining values indicate appreciation. Data of US inflation are taken from IMF(1995, Table A9, p133). Because of the lack of data, we cannot estimate the real trade-weighted index as real effective exchange rate. The estimation based on the bilateral exchange rate of Dong against US dollar may result in an exaggerated view of the Dong's appreciation.

Source: -The estimation and data are mainly based on data from the SPC (1994) and the World Bank (1993, Table 4.1, p.242 and 1994a: Table 2.1, p.4 and Table 3.2, p.10). The revised data of 1994 and 1995 are provided by the SBVN and the CIEM. (References to data in Dang Duc Dam (1995a), GSO (1994) and Le Dang Doanh (1995) also are made).

Regarding the state budget, revenue has increased sharply since 1992 due to better tax collection and the revenue from increasing oil production (see, for example, Table 6 in Riedel and Comer 1996 and Table A13 in Dodsworth *et al* 1996). The improved domestic revenues, together with the available aid resources, allowed the government not only to implement the salary reform in the public sector in 1993, but also concentrate much more on the public investment program which was earlier curtailed in 1991. More importantly, the way of financing budget deficits has changed. Although there are quite different figures from different sources, it is believed that the use of the SBVN as a source for monetizing the budget deficit has become much less significant²³. This situation is in contrast to the past when the SBVN's credit, together with foreign assistance, were mainly used to cover the budget deficits.

However, the budget alone does not fully describe the overall public finance. The quasi-fiscal deficit (the consolidated balance sheet of the government which also includes assets and liabilities of the SOEs and the state-owned financial institutions (including the SBVN)) should also be taken into account. In fact, the government has continued to use public financial institutions other than the SBVN, such as the SOCBs and the Social Security Fund, as the sources for the budget payments. It is also reported that many government bodies (the Treasury and the General Department of Investment, for example) have accepted deposits or supplied loans outside the control of the SBVN (*Economic Development Review* No 22, June 1996). The existing

²³ For example, according to data from the SPC (1994) and Dang Duc Dam (1995b), since 1991 Vietnam has ended the use of the SBVN's credit to cover the budget deficit. But the preliminary estimation given in the World Bank (1994b, Table 5.1) shows that in 1993, for example, the financing of the budget deficit through the SBVN still existed, although this source of finance was small and even negative in 1991 and 1992, respectively.

refinancing facilities that mainly benefit the SOCBs, may represent another channel for increasing the quasi-deficits. Recently, moreover, there has been a tendency to return to support the SOEs with price subsidies, preferred interest rates, depreciation and tax reductions as in the case of 1990-91 when the reforms were somewhat reversed.

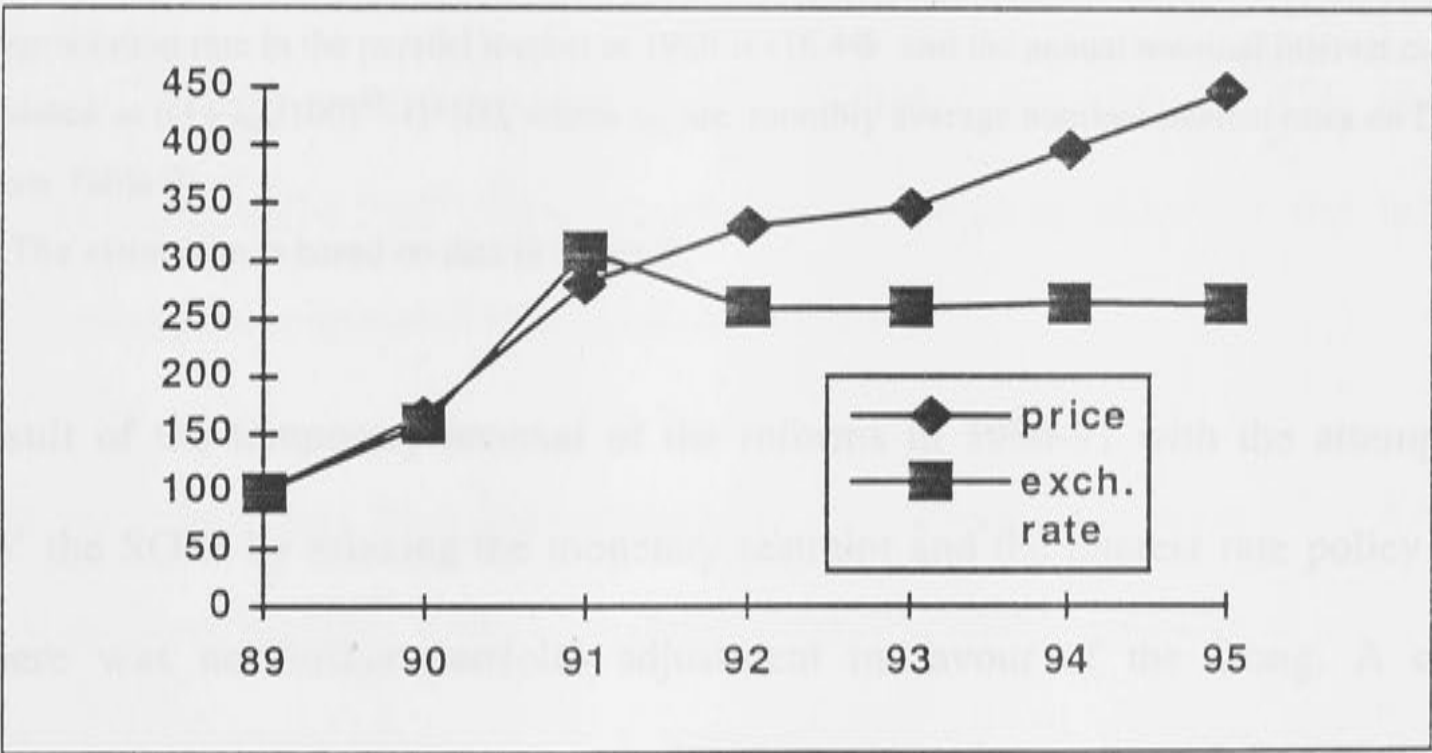
Table 9 shows that throughout the first half of the 1990s, the government continued to exploit the SBVN's capacity to create 'easy money' through seigniorage. The annual values of the seigniorage are quite significant as percentages of GDP. Also, in recent years the growth rate of money supply has been still rather high. Put together, these figures alone can hardly explain the low inflation rate since 1992.

One fact, which was mentioned in Chapter 2 (Section 2.2.3) is that the inflation rates appear to be no longer sensitive to changes in domestic credit as in the past, when the banking system played only an accommodating and passive role. But the correlation coefficients calculated from Table 9 between the change in the currency in circulation, M1, and M2 and inflation rates during the period of 1990-95 are 0.666, 0.880 and 0.823 respectively. The high degree of association between the change in M2 and inflation rates may indicate that the international reserves management has played a new role in affecting inflation through the building up (1990-95 except 1993) or the running down (1993) of the net foreign assets. With regard to the effect on the exchange rate, however, the net interventions of the SBVN have been modest. Since 1992, the nominal exchange rate has remained fairly stable, although during 1990-91 it closely followed the price level, depreciating as inflation rose (Figure 8). One main reason for the real appreciation of the domestic currency (the Dong) has been a surge

in capital inflows stemming from the growth in exports, foreign investment and aid, and private remittances. This happened even though the SBVN intervened in the foreign exchange market in 1992, 1994 and 1995 by purchasing US dollars.

Given the active interest rate policy implemented by the government, the relatively stable nominal exchange rate since 1992 has reinforced the portfolio choice in favour of the Dong, which in turn has contributed to slowing down inflation. Also, since 1990 Vietnamese citizens possessing foreign exchange have had the right to deposit it in a foreign exchange account and receive interest at the SBVN rate.

Figure 8: Nominal Exchange Rate and Price Level, 1989-95 (Index, 1989=100)



Source: The estimation is based on data in Table 9

In 1989, the high interest rate policy did its job in defending the domestic currency and fighting inflation. The very high nominal and real interest rates (Tables 9 and 10) strongly increased demand for domestic money and hence succeeded in offsetting the

impact of a high rate of monetary expansion on inflation. This policy was, of course, very costly and could not be sustained.

**Table 10: The Rates of Return on Dong in Real Terms
and in Terms of US Dollars (1989-95)**

| | <u>1989</u> | <u>1990</u> | <u>1991</u> | <u>1992</u> | <u>1993</u> | <u>1994</u> | <u>1995</u> |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Annual real rate of return on Dong ($i_d - \pi$): | | | | | | | |
| - demand deposit | 70.0 | -29.0 | -33.9 | 3.9 | 5.2 | -5.7 | -4.0 |
| - time deposit | 118.8 | 0.3 | -12.1 | 22.8 | 17.2 | 8.0 | 9.7 |
| Annual rate of return on Dong in terms of US\$ (measured as $i_d - \varepsilon$) ^a | | | | | | | |
| - demand deposit | 121.1 | -20.6 | -60.3 | 37.3 | 10.4 | 7.0 | 9.1 |
| - time deposit | 169.9 | 8.8 | -38.4 | 56.2 | 22.4 | 20.7 | 22.8 |

Note: a- ε is current depreciation rate.

- The depreciation rate in the parallel market in 1989 is -16.4% and the annual nominal interest rates are calculated as $((1 + i_{dm}/100)^{12} - 1) * 100$, where i_{dm} are monthly average nominal interest rates on Dong taken from Table 9).

Source: The estimation is based on data in Table 9.

The result of the temporary reversal of the reforms in 1990-91 with the attempt to 'rescue' the SOEs by relaxing the monetary restraint and the interest rate policy was that there was no further portfolio adjustment in favour of the Dong. A close association between inflation and money growth was observed. Also, the prices of foreign exchange and gold increased well ahead of the rate of inflation (World Bank 1992). A household survey undertaken by McCarty (1994) shows that in 1991, the holding of dollars (gold), rice, and other goods was registered as the most important components of a saving portfolio. The highly negative value of the difference between the deposit interest rate and the depreciation rate during 1990-91 (Table 10) indicates

that a better option for households was to deposit dollars in banks to get some interest or even to keep dollars in hand. High money growth together with a substantial decrease in real demand for the domestic currency, are seen to be important factors explaining the relatively high inflation rates in 1990 and 1991 (see Formula 6, Section 3.2.1).

But since 1992, with the new commitment to keeping inflation under control, the real time deposit interest rate has again become positive and the difference between the deposit interest rate and the depreciation rate has been much greater than the deposit interest rate on dollars (about 8% per year). During 1992-95, there existed real incentives for people to shift their financial portfolios out of US dollars and into domestic currency deposits. For example, in 1995 the time and saving deposits increased by 72.5% compared to the foreign exchange deposits (23.4%) and T-bond/T-bill deposits (34.7%)²⁴. Also, people now no longer consider rice and durable goods important components in their portfolio choice.

Last but not least, apart from the inflation tax, the source of revenue from issuing money also stems from the increase in demand for real money balances as a result of an increase in income, especially in a growing economy. In Vietnam, even in the 1980s when the economy was a MPE, the demand for money function had high income elasticity, which reflects the rapid process of monetization under the increasing coordination of economic activities through the free market due to 'fence breaking' and certain microeconomic reforms (Chapter 1, Section 2.2.1). This process

²⁴The figures are provided by the SBVN. Also, according to Nguyen Thi Hien (1995), the Vietnamese people still prefer 3 or 6 month-deposits rather than longer-run T-bills even with higher interest rates.

appears to have continued as market-oriented reform took place since 1989. As a result, Vietnam may gain from the rise in demand for real balances associated with strong *overall* economic growth: there is room for increasing the money supply without introducing the risk of higher inflation.

However, this kind of benefit should be interpreted with caution. In Vietnam, the pressure on and the variation in the inflation rate which is measured in terms of the CPI, are associated, to some extent, with changes in agricultural output. Also, given the still close relationship between the SOE sector and the banking system, and the fact that most monetary expansion is absorbed by the industrial and service sectors, the benefits from the growth in these sectors alone may not be enough to offset the risks of higher money supply.

Summary

Despite the progress in the reform of the financial sector in the first half of the 1990s, Vietnam remains an 'underbanked' country. The financial environment is characterized by the dominant role of the SOCBs whose lending policies are biased against the non-state sector, the limited markets for domestic securities, the existence of a significant informal financial sector, and the lack of the necessary public confidence in the banking system. Public finance still plays a very important role in money supply and contains the elements that may lead to the expansion of money supply without rigorous control. This is, of course, understandable since the financial sector has been reformed from a passive, monolithic banking system in an economy

with dominant state ownership, and the government still likes to see the 'leading role' of the state sector in the economy. Also, the underdevelopment of the financial sector has constrained the efficient use of the market-based monetary instruments. One major problem facing Vietnam now is the dilemma between the imperative of controlling effectively money supply through rigid direct measures and the urgency of promoting a financial system with efficient financial resource allocation.

A preliminary assessment in this chapter suggests three main factors that have contributed to the slowing down of inflation since 1989 in Vietnam. The first factor is the fiscal restraint and harder budget constraint of the SOEs which form the foundation of a sounder monetary policy. The second is the financial portfolio choice with the shift out of US dollars and towards the Dong. And the third is related to the process of monetization associated with strong economic growth from a relatively low level of per capita income.

The characteristics of the financial system and the (suggestive) factors behind the inflationary movement should be taken into account in developing any appropriate (dynamic) model of inflation for Vietnam. Also, the varying significance of these factors on the inflation rate deserves to be investigated more rigorously.

Chapter 4

A Theoretical Model of Seigniorage,

Inflation and Expectation for Vietnam

4.1. The theoretical models of inflation: An overview of the literature

In the past two-and-a-half decades, many countries have gone through high inflation episodes, largely as a result of internal crises reflecting macroeconomic mismanagement and a failed response to external shocks. Economic stabilization, which is defined as the attempts to correct excessive or unsustainable balance of payments deficits, to reduce the rate of inflation, or (usually) both²⁵, has become a central policy issue for many developing countries, the economies in transition as well as for international agencies. The problem of stabilization has also been the subject of a large number of studies that covered not only the general issues of stabilization but also many case studies (see, for example, Balcerowicz and Gelb (1995), Blanchard *et al* (1991), Bruno (1993), Bruno *et al* (1991 and 1988), Cline and Weintraub (1981), Dornbusch (1986 and 1992), Dornbusch and Fischer (1993), Dornbusch *et al* (1995), Killick (1984), Kolodko *et al* (1992), Parkin and Zis (1976), Schipke and Taylor (1994), World Bank (1996)).

²⁵ Here we focus on the inflation problem.

Two approaches, the orthodox and the heterodox approach, have been usually adopted for stabilizing the economy and, in many cases, with the IMF behind them. The orthodox program (for example, the cases of major stabilization in Bolivia (1985), Chile (1975), and Vietnam (1989)) focuses on the removal of the source of fundamental disequilibrium and usually combines traditional anti-inflationary measures such as fiscal and monetary restraint and appropriate adjustments for the exchange rate. The heterodox program (for example, the cases of Argentina in 1985, Brazil in 1986, Israel in 1985, Mexico in 1988, and Poland in 1990) uses the nominal anchors by controlling or fixing some kind of prices (wage, exchange rate,...) as the means to stabilize the economy²⁶. The justification for the use of nominal anchor(s), which may lead to distortion in resource allocation, is that the correction of the public deficits may not be enough to stop inflation because of inertia, sluggish expectation, or lack of credibility. It is also believed that the longer-run benefits from a sharp disinflation, if it persists, may outweigh the temporary distortive effects of controls.

The application of two approaches, however, has seen a mixed result: both their programs have experienced successes and failures (see Bruno *et al* 1991). The experience of inflation stabilization, together with consideration of the causes of inflation in Chapter 3 (Section 3.2.1), has shown the complexity of inflation problem. To a large extent, the choice of a stabilization program and its outcomes depend on the specific country characteristics, such as the role of the public sector, the financial structure, the degree of indexations of the economy, and the history of inflation. In a study of German inflation, Dornbusch (1987) concluded that 'stabilization appears a

much more diffuse, multifaceted issue than a simple monetary model would predict' and that 'only a broader model of the hyperinflation economy that models real exchange rates, portfolio balance, and credibility' can hope to address this issue.

In fact, many theoretical models have been built to deal with the problem of inflation (and balance of payments) stabilization in developing countries and the economies in transition. They attempt not only to explain the sources of, and the policy impacts on, inflation, but also to give some useful policy advice. They can be divided into three broad groups: 1-Generalized macroeconomic models; 2- Smaller macroeconomic models with emphasis on the specific structure of the financial sector; 3- Smaller macroeconomic models with multiple inflation equilibria.

The first group captures the widely accepted specifications for the key behavioural equations of the subsectors such as the private sector, the public (government) sector, the foreign sector, and the financial system, that are interrelated in a consistent macroeconomic accounting framework (Haque *et al* 1990, Khan and Knight 1981, Khan and Montiel 1989, Khan *et al* 1990, and Yung Chul Park 1973). A typical example is the model developed by Khan *et al* (1990) (or the model by Khan and Montiel (1989)). This model, in fact, combines both the IMF approach, which links the financial sector with the balance of payments, and the World Bank approach, the core of which is a variant of the Harrod-Domar growth model of an open economy, to allow for the treatment of economic growth, balance of payments improvement and price stability as the explicit policy objectives. Overall, the results of the comparative-static analyses are quite consistent with the standard view. For example, a credit contraction usually associated with a reduction in the fiscal (public) deficits, will

reduce domestic prices and (real) output, and improve the balance of payments; a devaluation will increase prices and improve the balance of payments, but the output impact may be contractionary²⁷. However, the important point is that, with two policy instruments- overall (public) credit ceilings and the exchange rate devaluation- the authorities can attain the targeted values for both the balance of payments and the rate of inflation.

Despite this capability in predicting outcomes for the principal macroeconomic variables, the generalized models contain certain limitations. These models are often one-period models, and therefore, they cannot trace well the transition of the economy from one equilibrium to another. Even a quite simple generalized model cannot be used readily for empirical study because of the lack of necessary data. The econometric estimations usually are based on panel data, and hence, the 'goodfit' model can be only regarded as the appropriate framework for a 'representative' developing country (see, for example, Haque *et al* 1990, and Khan and Knight 1981). This is not to deny the common economic relationships across countries, but the diversity of developing (and transitional) economies in terms of real sector and financial system development, argues for a more flexible approach in the design of stabilization programs. The following two groups of models attempt to deal with these limitations and to provide more insight into the inflation problem in these economies.

The second group emphasizes the specific features much more, especially the financial characteristics of the developing/transitional economies. The models

²⁷This result is quite model specific. In the more general case, there is a deal of ambiguity about whether devaluation would raise or lower output on impact (Lizondo and Montiel 1989).

developed by Bruno (1979), and Taylor (1981) provide support for the structuralist critique that the conventional package of orthodox stabilization policies may be stagflationary, ie. credit contraction may result in higher inflation and lower output expansion. The crucial feature of these models is that interest costs enter directly into production costs and final prices because of interest expenses for working capital. Thus, the financial deregulation may be not desirable for inflation control and growth. The link with the financial system, however, is used in some other theoretical models to support the role of financial liberalization in a 'repressed' economy. Kapur (1976) presented a model that shows that an increase in interest rates on money (which, cannot be beyond the point where the real loan rate equals the rate of profit on working capital) has very favourable short-run effects on real output and so, reduces inflationary pressure given aggregate demand. The reasons behind these outcomes are that higher deposit rates lead to an increase in bank deposits, and hence the net flow of real bank credit to finance investment.

The results may, however, be quite different if the role played by the informal sector is important in the interaction between the financial and real sectors (Buffie 1984 and Van Wijnbergen 1983). In such models, depending on the extent curb loans could substitute for deposits, an increase in deposit interest rates does not necessarily increase the total supply of loanable funds or lead to a shift out of an 'unproductive' asset like gold or commodity stock. Thus, raising deposit rates can be contractionary and may lead to more rather than less inflation in the short run. Some recent theoretical considerations have also adopted the skeptical approach to high interest rate policy, though since the 1980s, this policy has been a popular method of

defending the domestic currency and fighting inflation in many high-inflation countries. The constraints on the effectiveness of this policy would be particularly acute when the credibility of an anti-inflation program is not established, and when the financial burden of nonviable enterprises is large and/or the public sector finances cannot be subordinated to a restrictive credit policy (Bennett and Schadler 1992, Calvo 1992, and Calvo and Coricelli 1992). Calvo and Vegh (1995) have also shown that in a small open economy under flexible prices, although a temporary increase in the deposit rate leads to an initial fall in the price level, inflation increases exponentially afterwards. Paying higher interest on money, thus, will only exacerbate the stop-and-go inflation cycles.

Two aspects of the exchange rate are often included in the theoretical models of inflation stabilization: the use of the exchange rate as a nominal anchor and the role of the parallel currency market. The study by Fischer (1986) shows that in a small open economy with perfect capital mobility and wage contracts set for either one or two periods, exchange-rate-led stabilization is, in general, less costly than that led by a money-growth target in terms of the sacrifice ratio- the ratio of total loss of output to the fall in the inflation rate. It is worth noting some practical advantages of an exchange rate anchor. First, international prices would exert an immediate tight discipline on domestic price increases through competition because, in an open economy, tradeable goods form a substantial part of the goods basket. Second, the fixed exchange rate would shift expectation to a new regime of price stability. But the defects of the (rather long) fixed exchange rate-policy are that it can lead to real appreciation and the resulting overvaluation can become very costly due to capital

flight and increased import spending (Dornbusch 1986). It is, therefore, argued that once credibility has been achieved, the exchange rate as a key anchor in the early stages of rapid stabilization should give way to a more flexible regime (Bruno 1991). Mexico at the end of 1994 is a good example of this point: the economy succumbed to the crisis because of the rigid exchange rate policy (Dornbusch *et al* 1995).

A review of recent theoretical and empirical analyses of parallel currency markets in developing countries and an examination of the policy issues such as the effectiveness of exchange control, devaluation and parallel market premia and unification, are given in Agenor (1992). In the macroeconomic model, with the sizeable parallel market for foreign exchange developed by Agenor (1990), the inflationary impact of expansionary (fiscal and credit) policies is larger, and the output effect is smaller, than would be the case in an economy without foreign exchange rationing. The reason is that these policies are associated with a more depreciated parallel exchange rate. The inflation outcome of exchange rate unification is analyzed in the studies by Kharas and Pinto (1989), Lizondo (1987), and Pinto (1991). This policy could generate much higher inflation. Moreover, as Kharas and Pinto (1989) have pointed out, the economy then may converge to a high-inflation, saddle-point stable equilibrium given a fiscal deficit. Note that most studies of the parallel currency market have used the portfolio-balance approach to exchange rates as a basic strand of the analysis. This approach is also applied in Calvo and Frenkel (1991) for analysing the effects of price liberalization in the early phase of economic transformation and in Goldberg and Karimov (1992) for studying the erroneous interpretation of black-market exchange rates as indicative of post-reform equilibrium rates in a transitional economy.

The interesting point in Kharas and Pinto (1989) that there may exist many inflation equilibria, is not new. Several other studies that are here regarded as the third theoretical model group, have focused on this point (Bruno and Fischer 1990, Evans and Yarrow 1981, Kiguel 1989, Liviatan 1983, Ruggerone 1996, Sargent and Wallace 1981 and 1987, Savastano 1992) . The idea is quite simple. Since a 'monetized' budget (public) deficit can be financed with inflation tax or 'seigniorage revenue', the same amount of real deficit can be sustained in low or high-inflation equilibrium depending on whether inflation is low or high and the tax base is high or low. ('Seigniorage revenue' denotes the real value of money printed by the government; 'inflation tax' usually denotes the loss in real value of money held by the population. In a steady state, where real money balances ($m=M/P$) are constant, they are the same.

Indeed, this is directly implied from the formula $\dot{m} = \frac{\dot{M}}{P} - m\pi$, where π is inflation rate)

Moreover, the relationship between inflation and the budget deficit is, in general, not linear, as can be seen in Formula (10) (Chapter 3, Section 3.2.1). In addition, the real 'monetized' budget deficit can be expected to be an increasing and concave function of the inflation rate. Indeed, without the loss of generality, we assume the monetized budget deficit, measured as a percentage of real output and denoted by d , is the only source of change in money supply. Then Formula (10) can be rewritten as

$$d = \frac{\pi + n}{k(\alpha + \beta\pi)} . \text{ This implies}$$

$$\frac{\partial d}{\partial \pi} = \frac{\alpha - \beta n}{k(\alpha + \beta\pi)^2} \quad \text{and} \quad \frac{\partial^2 d}{\partial \pi^2} = \frac{-2\beta(\alpha - \beta n)}{k(\alpha + \beta\pi)^3} \quad (11)$$

Since βn , in general, is small in comparison to α , so $\partial d / \partial \pi > 0$ and $\partial^2 d / \partial \pi^2 < 0$ (Recall that α represents noninflationary level of velocity, β is the responsiveness of velocity to the inflation rate, k is the money multiplier, and n is growth rate).

Therefore, *under certain circumstances* that could depend on the private sector's behaviour in relation to money holding and its dynamic expectations, there would be a Laffer curve of inflation tax revenue and a maximum deficit that can be financed by printing money. Going beyond that point implies hyperinflation. Note that the third group of theoretical models has been applied for analyzing a number of countries that experienced high inflation: Argentina (Kiguel and Neumeyer 1995), Brazil (Cardoso 1991), Israel (Bruno 1989), Russia (Sachs 1995), Ukraine (Havrylyshyn *et al* 1994), Ukraine and Latvia (Ruggerone 1996), Yugoslavia (Bole and Gaspari 1991).

One direction for studying the stabilization problem in Vietnam is to build a rather complex macroeconometric model (eg. Nguyen Van Qui 1994), which can be used for examining the effects of policy change on prices, among other macroeconomic variables. However, as stressed by Bruno (1989), in economies characterized by short time-series and rapid 'regime' changes (like the Vietnamese economy), such a model can have only limited use for policy work. It is much more useful to apply small compact models with an emphasis on their underlying theoretical grounding. The approaches used in the second and/or third groups of modelling may identify ways for developing appropriate models of inflation for Vietnam.

In this chapter, we follow the last approach in developing a dynamic model of inflation, which combines three strands of analysis: the 'traditional' view of government inflation finance; the role of private sector behaviour with financial portfolio choice; and dynamic expectations of inflation. Such a model is, therefore, more likely to capture the most noticeable characteristics of the financial system and economic behaviour in Vietnam considered in Chapter 3. This kind of model can be used also for examining the conditions for stability of inflation and the effects of policy changes and economic growth on the inflation rate. Furthermore, it allows us to understand the way in which the economy can go to hyperinflation and change positions between a stable high inflation ('high inflation trap') and a low inflation equilibrium. All these considerations are very relevant for Vietnam, which is a country exposed to hyper-inflation in the 1980s, but now seems to be on a relatively low inflation path.

4.2. A model of seigniorage, inflation and expectation for Vietnam

4.2.1. The Model

The model developed here follows the line of analyses in most studies in the third group of models of inflation, particularly in the study by Bruno and Fischer (1990). Our model, however, emphasizes interest rates on money and the changes in the exchange rate (depreciation rate) as the main factors determining the opportunity cost of money holdings. The role of real income in the demand function for money is also specified in a more general form than in most studies which usually assume unitary

income elasticity in the real demand for money. Moreover, in the analysis of the model, we apply the idea of the coordination between monetary and fiscal policies put forward by Sargent and Wallas (1981). It is argued that which policy is dominant matters for the problem of inflation control. An extension of the model with variable output is also considered.

The model consists of three equations:

$$d = \frac{\dot{M}}{P y} \quad (12)$$

$$\frac{M}{P} = f(y) \exp(-\gamma(\varepsilon^e - i_d)) \quad (13)$$

$$\dot{\varepsilon}^e = \lambda(\pi - \varepsilon^e) \quad (14)$$

where all variables are denoted as before: M , P , y , and d are nominal money supply, price level, real income (or output), and fiscal deficit (public deficit) measured as a percentage of real income and entirely financed by borrowing from the central bank ($d > 0$); ε^e is expected depreciation rate, i_d is deposit interest rate, which is exogenously determined by the government, and π is inflation rate. Both γ and λ are positive parameters; $f(y)$ is an increasing function, $f'(y) > 0$. We assume that real income y , the rate of change in y and the income elasticity of demand for real money are regarded as exogenous variables in this model²⁸.

²⁸One limitation of this kind of model of inflation is that there is no effect of money on growth. Note that, in order to avoid the effect of output, most studies assume unitary income elasticity and take the simplest form $f(y)=y$.

Equation (12) shows the relationship between the 'monetized' fiscal deficit and money supply. In contrast to Equation (7) where the central bank gives credit to both the government and the private sector (Chapter 3, Section 3.2.1), 'monetized' fiscal deficit d is the only source of change in high-powered money. For simplicity, we also assume the money multiplier k to be constant. Since the involvement of constant k in Equation (12) does not affect the results, so we can further assume that $k = 1$.

With Equation (13), the money market is in equilibrium and the right hand side determines the demand for real balances. Most studies apply Cagan's hyperinflation semilogarithmic model (Cagan 1956), in which real money holdings are determined only by inflationary expectations. In much less extreme inflationary conditions, real income should be an important determinant of money demand and, in a growing economy like Vietnam since 1989, the income elasticity of real money is possibly higher than unity (Recall that the income elasticity of demand for real money in the 1980s is estimated to be higher than two, see Chapter 2, Section 2.2.1 or Appendix, Part A.2). Also, the difference between the expected depreciation rate and deposit interest rate is considered the opportunity cost in Equation (13) rather than simply the expected inflation rate.

The expectations (Equation (14)) are supposed to be adaptive in the sense that the rate of change in the expected depreciation rate will be adjusted upward as the 'gap' between current inflation rate and current expected rate of depreciation increases. A main disadvantage of the adaptive expectations assumption is that private agents only limit themselves to a very narrow set of information to form expectations. However, as Bruno and Fischer (1990) mentioned, this assumption makes the most sense where

the statistical systems are poorly developed or there does not exist much credibility concerning the government's policies. Also, according to Equation (14), the expected exchange rate is allowed to diverge from purchasing power parity (PPP) in the short run²⁹. This seems to be consistent with the behaviour of the exchange rate movement in Vietnam since 1992, where the nominal exchange rate has remained fairly stable while price level has continued to rise, albeit at a moderate level. Moreover, the 'rational expectation' which here is defined as $\varepsilon^e = \pi$ or that the PPP always holds, represents the limiting case when $\lambda \rightarrow \infty$ in Equation (14).

Equations (12) and (13) in combination will give us

$$d = \frac{\dot{M}}{M} \frac{M}{Py} = \theta \frac{f(y)}{y} \exp(-\gamma(\varepsilon^e - i_d)) \quad (15)$$

where θ is growth rate of money, $\theta = \frac{\dot{M}}{M}$ and $\theta > 0$.

For ease in recognizing the direction of the relationships between the variables, we also express Equation (15) in natural logarithm

$$\gamma \varepsilon^e = \log \theta - \log d + \log(f(y)/y) + \gamma i_d \quad (15')$$

Taking the natural logarithm and differentiating (13) with respect to time, we obtain

²⁹Note that the PPP condition is that $(E^e P^*)/P=1$ where E^e is expected exchange rate, P^* is foreign price level and P is domestic price level. With the assumption of constancy of P^* , it is easily to derive $\varepsilon^e = \pi$.

$$\frac{\dot{M}}{M} - \frac{\dot{P}}{P} = \frac{f'(y)\dot{y}}{f(y)} - \gamma\dot{\varepsilon}^e = \frac{\partial f(y)}{\partial y} \frac{y}{f(y)} \frac{\dot{y}}{y} - \gamma\dot{\varepsilon}^e \quad (16)$$

$$\Rightarrow -\gamma\dot{\varepsilon}^e = \theta - \pi - \eta_{my}n \quad (17)$$

where η_{my} is the income elasticity of money demand ($\eta_{my} = (\partial m / \partial y)(y/m) = (f'(y)\exp(\dots)y)/(f(y)\exp(\dots)) = (\partial f / \partial y)(y/f)$ from (13) with $m = M/P$) and n is growth rate of real output.

In the steady state, $\dot{\varepsilon}^e = 0$, so $\varepsilon^e = \pi$ (from Equation (14)) and Equation (17) implies

$$\varepsilon^e = \pi = \theta - \eta_{my}n \quad (18)$$

In Equation (15) (or Equation (15')), θ and d can be regarded as endogenous variables or shift parameters depending on which policy - fiscal policy or monetary policy - is dominant. Equation (18) differs somewhat from Formulas (6) and (10) (Chapter 3, Section 3.2.1), but they share the same internal root of (the steady state) inflation, notably the monetary expansion because of (quasi-) fiscal deficits, and the benefit from strong economic growth in the reduction of inflation. The interactions between curves (15 or 15') and (18) on the planes (ε^e, θ) or (ε^e, d) , depending on which dominant policy is examined, will show the steady state equilibria of expected depreciation rate and inflation rate (Remember that, in fact, they are equal to each other). The stability of any steady state equilibrium then will be determined by Equation (14). By using (17) to eliminate π in (14), we get

$$\dot{\varepsilon}^e = \lambda\gamma\dot{\varepsilon}^e + \lambda(\theta - \eta_{my}n - \varepsilon^e) \quad (19)$$

$$\Rightarrow \dot{\varepsilon}^e = (1 - \lambda\gamma)^{-1} \lambda(\theta - \varepsilon^e - \eta_{my}n) \quad (20)$$

Stability conditions for equilibria, thus, depend on the sign of $1 - \lambda\gamma$ and the position of the interaction point(s) between two curves (15 or 15') and (18). Now we will turn to the two cases when fiscal policy or monetary policy is dominant.

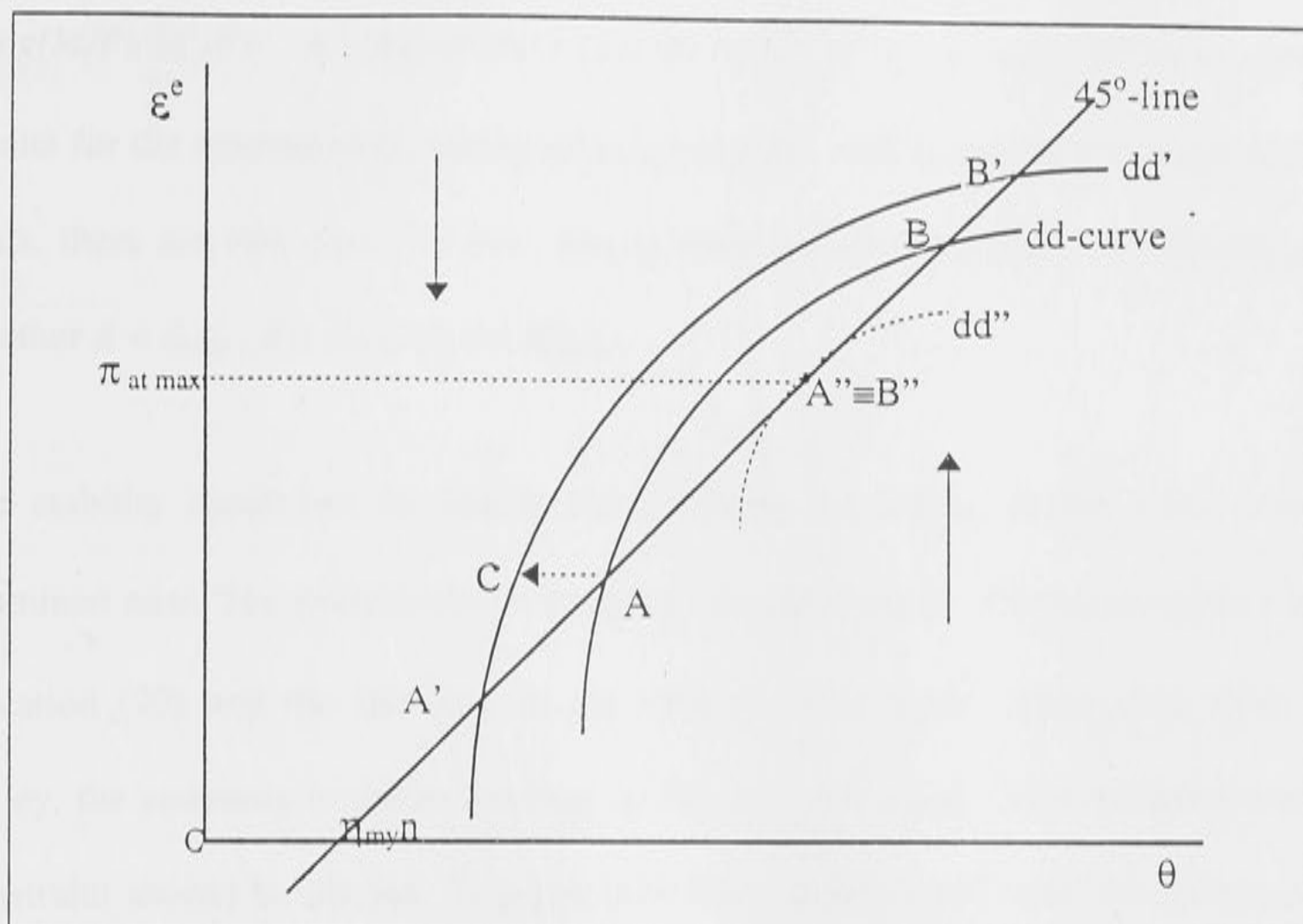
4.2.2. The case of fiscal policy dominating monetary policy

This case is close to the situation in most developing countries and economies in transition. In this case, the fiscal authority sets its budget and determines the amount of revenue that must be raised through bond sales, together with the amount borrowed abroad, and seigniorage. Then the central bank will be forced to create money to finance the 'monetized' part of the fiscal deficit, and hence, in our model money supply becomes entirely endogenous.

On the plane (ε^e, θ) , the ε^e in (15') is an increasing concave function of θ since $\partial\varepsilon^e/\partial\theta = 1/(\gamma\theta) > 0$ and $\partial^2\varepsilon^e/\partial\theta^2 = -1/(\gamma\theta^2) < 0$ (*dd*-curve in Figure 9). The steady state relationship (18) is the 45°-line with the intercept on the $O\theta$ -axis equal to $\eta_{my}n$. There are, at most, two points A and B representing steady state inflation equilibria. Since along the *dd*-curve, d is fixed, these equilibria reflect a kind of Laffer curve: the same amount of seigniorage may be obtained at either a low or high inflation rate, or in other words, at a low or high growth rate of money supply.

Figure 9: Inflation, Expected Exchange Rate and Money Growth

(Steady state equilibrium and the effects of changes in d and i_d)



In the steady state, the seigniorage revenue is given by

$$d = \theta \frac{f(y)}{y} \exp(-\gamma(\theta - \eta_{my}n - i_d)) \quad (21)$$

$$\Rightarrow \frac{\partial d}{\partial \theta} = \frac{f(y)}{y} \exp(-\gamma(\theta - \eta_{my}n - i_d))(1 - \gamma\theta) \quad (22)$$

Thus, $\partial d / \partial \theta = 0$ when $\theta = 1/\gamma$. The concavity of the dd -curve ensures that there exists maximum seigniorage value (d_{max}), corresponding to $\theta_{at max} = 1/\gamma$ and inflation rate $\pi_{at max} = 1/\gamma - \eta_{my}n$. On Figure 9, d_{max} will be achieved when dd -curve is tangent to the 45°-line at $A'' \equiv B''$. Also, the elasticity of demand for money with respect to ε^e at the

maximizing point is $-1 + \gamma\eta_{my}n$ (In fact, it is easy to obtain from Equation (13) that $\partial \log(M/P)/\partial \varepsilon^e = -\gamma$. But this elasticity is equal to $\partial \log(M/P)/\partial \log \varepsilon^e = (\partial \log(M/P)/\partial \varepsilon^e)\varepsilon^e = -\gamma\varepsilon^e$ and at the calculated point $\varepsilon^e = \pi_{at \max}$). All these similar results for the revenue-maximizing inflation rate are well known in Friedman (1971). Thus, there are two, one, or none steady state inflation equilibrium depending on whether $d < d_{max}$, $d = d_{max}$, or $d > d_{max}$.

The stability conditions for steady state inflation equilibria, if they exist, can be examined now. The examination is based on the direction of ε^e -motion implied from Equation (20) and the fact that, in the case of fiscal policy dominating monetary policy, the economy is always moving on the dd -curve since the government budget constraint should be obeyed. Together with the stability conditions, the transition of the actual inflation rate can also be traced.

For $\lambda\gamma < 1$ (*slow expectation adjustment*), in Equation (20) $\dot{\varepsilon}^e > 0$ if $\varepsilon^e < \theta - \eta_{my}n$ (or ε^e is below the 45°-line), and $\dot{\varepsilon}^e < 0$ if $\varepsilon^e > \theta - \eta_{my}n$ (or ε^e is above the 45°-curve). Thus, below the 45° - curve, ε^e increases, and above the 45°-curve, ε^e decreases, as indicated by the arrows on Figure 9. For $\lambda\gamma > 1$ (*fast expectation adjustment*), the arrows indicating the directions of ε^e -motion will be reversed. Figure 9 represents the case with dual equilibria and slow expectation adjustment: low equilibrium A is stable and high equilibrium B is unstable. The economy will converge to A from any point on the dd -curve to the left of B, but it will go to hyperinflation from the right of B. In the latter situation, the depreciation expectation never catches up to actual inflation.

This is implied from Equation (14): $\pi = \varepsilon^e + \frac{1}{\lambda} \dot{\varepsilon}^e$ and the fact that from the right of B ε^e is only increasing, so $\pi > \varepsilon^e$ always. When the economy is to the left of A, ε^e will be closer to π , although still less than π , and by the end will catch up to π at A. If ε^e is moving to A from the position between A and B, then $\varepsilon^e > \pi$ and by the end they are also in equality.

However, when the expectation is adjusted fast enough (one example is when the expectation is close to the 'rational' expectation), the economy may fall into the 'high inflation trap': point B becomes stable (and A unstable). (Of course, the motion of the expected depreciation rate in relation to the actual inflation rate along the dd -curve is not difficult to see in the same way as just mentioned above). Theoretically, the seigniorage revenue can achieve the maximum value in a steady state, but the only one equilibrium in this case obviously is never stable. Moreover, both the cases of the existence of one or no steady state equilibrium (d is too high) may correspond to explosive inflation³⁰.

Now we can look at the comparative analysis. One complication is that the effect of *output level* always exists because of output growth. We will consider only the case of a growing economy ($n > 0$) and hence the output level y always increases. Then from Equation (15) we can obtain

$$\theta = \frac{dy \exp(\gamma(\varepsilon^e - i_d))}{f(y)} \quad (23)$$

³⁰In fact, according to our model, the too large 'monetized' fiscal deficit could result in hyperinflation only when the expectation adjustment is slow. Kiguel (1989) has developed a model which shows that this is also the case for the rational (or perfect foresight) expectation.

$$\frac{\partial \theta}{\partial y} = d \exp(\gamma(\varepsilon^e - i_d)) \left[\frac{f(y) - yf'(y)}{f^2(y)} \right] \quad (24)$$

$$\text{or } \frac{\partial \theta}{\partial y} = \frac{K(1 - \eta_{my})}{f(y)} \text{ where } K = d \exp(\gamma(\varepsilon^e - i_d)) \quad (25)$$

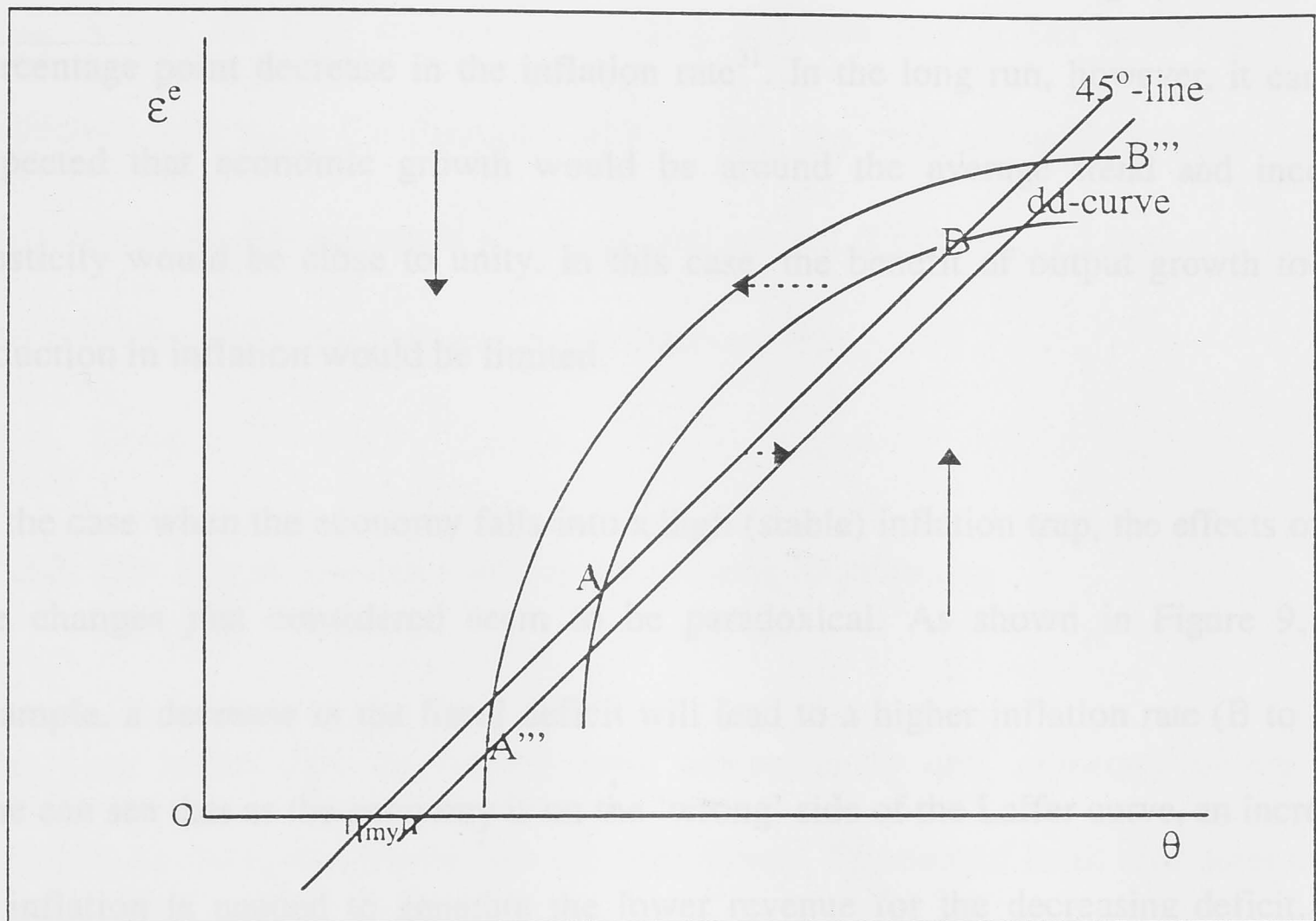
In a growing economy, it can be assumed that $\eta_{my} > 1$, so $\partial\theta/\partial y < 0$. This means that, given ε^e , an increase in y leads to a decrease in θ . In other words, the dd -curve will shift to the left. The sustained increase in output, thus, would reinforce or offset somewhat the effects of the changes in other exogenous variables in our model. Keeping in mind this fact, we now focus on the effects of changes in fiscal deficit d , in interest rate on money i_d , and in growth rate of output n .

Suppose firstly that the economy is initially in a stable low steady state inflation equilibrium, point A. An decrease in d then will only shift the dd -curve to dd' (Figure 9) (since for Equation (15) $\frac{\partial \theta}{\partial d} > 0$ and Equation (18) does not depend on d). The decrease in d implies an instantaneous shrink in the growth rate of money from A to C. The expected depreciation rate, and so the actual inflation rate, will decline along the dd' -curve until the economy reaches a new lower equilibrium, point A'. A rise in i_d has the same qualitative effect on the steady state inflation as a decrease in d (From (15) $\partial\varepsilon^e/\partial i_d = 1 > 0$, so the dd -curve will be shifted up). This is because real demand for (domestic) money will be increased. Therefore, the central bank can print money less rapidly to finance a given fiscal deficit as the inflation tax base is now larger. An increase in n shows in Figure 10 as a rightward shift of the 45°-line since for Equation

(18) $\frac{\partial \theta}{\partial n} = \eta_{my} > 0$. At the same time, the output expands much more. Indeed, suppose

$y = y_0 \exp(nt)$ with t as the time variable, then $\partial y / \partial n = t y_0 \exp(nt) > 0$. As a result, the steady state inflation goes down further from A to A''' (Figure 10).

Figure 10: The Effects of Changes in Output Level and Growth Rate



We can calculate the change in steady state inflation corresponding to a one percentage point change in the growth rate. We have

$$\pi = \theta - \eta_{my} n = \frac{dy \exp(\gamma(\pi - i_d))}{f(y)} - \eta_{my} n \quad (26)$$

$$\frac{\partial \pi}{\partial n} = \frac{\gamma dy \exp(\gamma(\pi - i_d))}{f(y)} \frac{\partial \pi}{\partial n} + d \exp(\gamma(\pi - i_d)) \frac{\partial y}{\partial n} \left(\frac{f(y) - y f'(y)}{f^2(y)} \right) - \eta_{my} \quad (27)$$

But, again, $dy \exp(\gamma(\pi - i_d)) / f(y) = \theta$ and $y f'(y) / f(y) = \eta_{my}$, so that

$$\frac{\partial \pi}{\partial n} = (1 - \theta\gamma)^{-1} \left[\frac{\partial y}{\partial n} \left(\frac{1 - \eta_{my}}{f(y)} \right) - \eta_{my} \right] \quad (28)$$

If growth rate of money is not too large (in the sense that $1 - \theta\gamma > 0$), then $\partial\pi/\partial n < -1$ and hence, a one percentage point increase in n would lead to a greater than one percentage point decrease in the inflation rate³¹. In the long run, however, it can be expected that economic growth would be around the average trend and income elasticity would be close to unity. In this case, the benefit of output growth to the reduction in inflation would be limited.

In the case when the economy falls into a high (stable) inflation trap, the effects of all the changes just considered seem to be paradoxical. As shown in Figure 9, for example, a decrease in the fiscal deficit will lead to a higher inflation rate (B to B'). One can see that as the economy is on the 'wrong' side of the Laffer curve, an increase in inflation is needed to generate the lower revenue for the decreasing deficit. An intuitive explanation may be based on portfolio choice. The instantaneous monetary squeeze due to the fiscal cut implies an increase in the value of the domestic currency (The same thing is true for an increase in i_d or in output). Since the expectation is quickly adjusted, the new signal for the value of the domestic currency leads to an equal shift in the depreciation rate, and so also in the inflation rate, in order to keep the existing portfolio balance between domestic and foreign currency. Calvo (1992)

³¹ With $\eta_{my} = 1$, we get the formula in Bruno and Fischer (1990). However, their conclusion that one point percentage increase in n implies a greater than one percentage point increase in π , does not always hold. This is true only for a not too large θ .

got nearly the same result when he found that under perfect foresight ($\varepsilon^e = \varepsilon$), an increase in interest rates for deposits will result in higher steady state inflation.

Note that, in the case of very high inflation, the benefits of real income growth as a source of seigniorage revenue are quite small. As can be seen from the formula for π_{atmax} above, the high revenue-maximizing inflation rate is not sensitive to the correction term $\eta_{my}n$. For example, with $\gamma = 0.5$, the peak of the seigniorage Laffer curve would be 200 percent if $n = 0$ and 180 percent if even $\eta_{my} = 2$ and $n = 10$ (see also Friedman 1971 and Dornbusch and Fischer 1993).

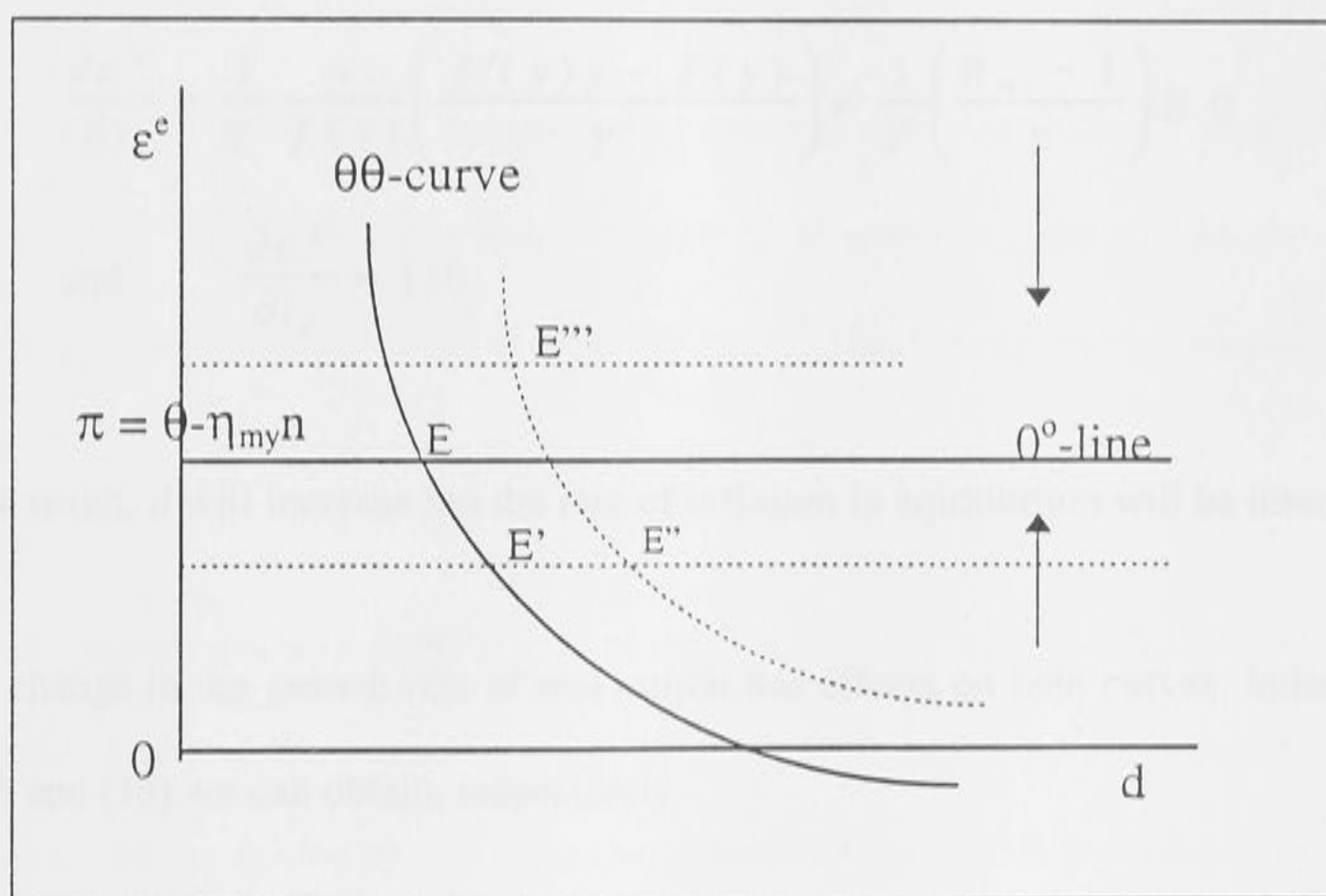
4.2.3. The case of monetary policy dominating fiscal policy

This case means that the central bank independently sets monetary policy, for example, by fixing the growth rate for base money. The central bank also determines the nominal amount of credit given to the fiscal authority. The fiscal authority is forced to finance the remainder of the deficit by bond sales and/or foreign borrowings.

In our model, this scenario can be analyzed on the plane (ε^e, d) . ε^e in Equation (15') is a decreasing and convex function of d since $\partial \varepsilon^e / \partial d = -1/(\gamma d) < 0$ and $\partial^2 \varepsilon^e / \partial d^2 = 1/(\gamma d^2) > 0$ (the $\theta\theta$ -curve in Figure 11). The shape of the $\theta\theta$ -curve shows that for a given growth rate of money, a higher 'monetized' fiscal deficit can be financed only with a lower exchange rate expectation. It is easy to see that the $\theta\theta$ -curve always cuts the Od -axis and is asymptotic to the $O\varepsilon^e$ -axis ($\lim \varepsilon^e \rightarrow \infty$ when $d \rightarrow 0$). Note also that,

similarly as in the case of the dominant fiscal policy, the ‘power’ of the monetary authority now forces the economy to move on the $\theta\theta$ -curve. Equation (18) presents simply the line parallel to the Od -axis (the O° -line). Thus, there always exists an unique steady state inflation equilibrium equal to $\theta - \eta_{my}n$. This feature of the model is in favour of the well-known argument for central bank independence: the central bank can permanently control inflation since it is free to choose any path for money growth. Moreover, by sustaining a low growth rate of money supply, the economy will avoid falling into the equilibrium trap with high stable inflation.

Figure 11: Inflation, Expected Depreciation Rate, and Fiscal Deficit



The (only) equilibrium E -the intersection between two curves- is stable when expectation adjustment is slow ($\lambda\gamma < 1$) (indicated in Figure 11) or unstable when expectation adjustment is fast ($\lambda\gamma > 1$). If E is unstable equilibrium and the position of

the economy is above the equilibrium point, the expected depreciation rate will go to infinity. In this case, the economy also runs into hyperinflation and once again, the depreciation expectation never catches up to actual inflation.

Now suppose that E is a stable equilibrium. The comparative effects of the changes in output level and growth, in interest rate, and growth rate of money supply, can be analyzed. It is clear that the changes in y or i_d only shift the $\theta\theta$ -curve and hence have no effect on inflation equilibrium. However, the revenue in terms of output through seigniorage will be changed. For example, the expansion of output (given $n > 0$) or an increase in i_d shifts the $\theta\theta$ -curve up, since from (15')

$$\frac{\partial \varepsilon^e}{\partial y} = \frac{1}{\gamma} \frac{y}{f(y)} \left(\frac{f'(y)y - f(y)}{y^2} \right) = \frac{1}{\gamma} \left(\frac{\eta_{my} - 1}{y} \right) \geq 0 \quad (29)$$

$$\text{and} \quad \frac{\partial \varepsilon^e}{\partial i_d} = 1 > 0 \quad (30)$$

As a result, d will increase but the rate of inflation in equilibrium will be intact.

The change in the growth rate of real output has effects on both curves. Indeed, from (15') and (18) we can obtain, respectively

$$\frac{\partial \varepsilon^e}{\partial n} = \frac{y}{\gamma f(y)} \frac{\partial y}{\partial n} \left(\frac{yf'(y) - f(y)}{y^2} \right) = \frac{1}{\gamma} \frac{\partial y}{\partial n} \left(\frac{\eta_{my} - 1}{y} \right) \geq 0 \quad (31)$$

$$\text{and} \quad \frac{\partial \varepsilon^e}{\partial n} = -\eta_{my} < 0 \quad (32)$$

Thus, as shown in Figure 11, the $\theta\theta$ -curve and O^o -line will shift up and down respectively as n increases and the lower, new inflation equilibrium will be E'' . The economy benefits not only in terms of lowering inflation but also in terms of revenue through seigniorage. But the benefit of a reduction in inflation would be quite small if the inflation rate was high. Since the position of the equilibrium depends only on the shift of the O^o -line, so according to (32), a one percentage point increase in n will lead to only an η_{my} -percentage point decrease in the inflation rate.

It is not difficult to see that the change in the growth rate of money also shifts both curves. Again, from (15') and (18) we have $\partial \varepsilon^e / \partial \theta = 1/(\gamma\theta) > 0$ and $\partial \varepsilon^e / \partial \theta = 1 > 0$, respectively. So, an increase in θ will shift up both curves. As a result of the new position of the O^o -line, the economy will move to a higher inflation equilibrium (E moves to E''' in Figure 11). But in regard to seigniorage, nothing can be said with certainty. Given the new level of θ , d may be increased or decreased depending on the relative positions of the shifts of the two curves.

In both cases, whether fiscal policy or monetary policy plays a dominating role, the essential point of the model is the stability conditions for inflation equilibrium. The question is how this condition would be changed if the model is extended to the case in which the real output growth can vary. In an open economy, the change in the expected real exchange rate may be an important factor in changing export and hence output. Taking this fact into account, suppose the supply function has the following form

$$y = y_0 \exp(nt) \left(\frac{E^e P^*}{P} \right)^\zeta \quad (33)$$

where t is time variable, E^e is the expected nominal exchange rate, P and P^* are domestic and foreign price levels respectively, and ζ is a positive parameter. With the assumption of the constancy of foreign price level, we can see that

$$\frac{\dot{y}}{y} = n + \zeta (\varepsilon^e - \pi) \quad (34)$$

Thus, growth rate of real output varies around the value of n , which now indicates this rate at the steady state ($\varepsilon^e = \pi$). By using the same procedure for obtaining Equation (17), we can obtain

$$-\lambda \dot{\varepsilon}^e = \theta - \pi - \eta_{my} [n - \zeta (\pi - \varepsilon^e)] \quad (17')$$

Then, using (14) to eliminate π in (17') will give us the formula which is similar to (20)

$$\dot{\varepsilon}^e = (1 - \lambda\gamma - \eta_{my}\zeta)^{-1} \lambda(\theta - \varepsilon^e - \eta_{my}n) \quad (20')$$

Although, there may be output expansion due to real exchange rate depreciation, this kind of benefit will have a destabilizing effect. Indeed, it enhances the likelihood that equilibria A in Figure 9 and E in Figure 11 are more difficult to become stable since the stability condition now requires that $1 - (\lambda\gamma + \eta_{my}\zeta) > 0$. This result is opposite to

²² In Bruno and Fischer (1990), the supply function has a Lucas-type form: $y = y_0 \exp(nt) (P/P^*)^\zeta$.

the case of a model for a closed economy, in which the expected inflation serves as a measure for the opportunity cost of holding money. As shown by Bruno and Fischer (1990), the fact that output supply is positively affected by an increase in unanticipated inflation, has a stabilizing effect on inflation equilibrium³².

Summary

There is substantial literature on the problem of inflation stabilization in developing countries and more recently, in transitional economies. A common belief is that money creation, usually associated with fiscal (public) deficits, is the root of the inflation problem, particularly in the case of high inflation. At the same time, the inflation problem in these economies cannot be understood without taking into account the characteristics related to the supply side and in particular, the issues related to financial structure, such as the limited role of markets for domestic securities, the legally determined interest rates on bank deposits and loans, and the coexistence of the formal and informal financial sectors. In particular, a number of theoretical models that capture the behaviour in such an underdeveloped financial environment, have been built to explain the inflationary movement and the possible policy effects on inflation.

In this chapter, a dynamic model of inflation for Vietnam was developed. The model reflects the features that seem to have had the most important impact on inflation in Vietnam: the public finance through seigniorage, the demand for domestic money in

³² In Bruno and Fischer (1990), the supply function has a Lucas-type form: $y = y_0 e^{\alpha(P/P^e)}$.

the context of the existence of a significant parallel foreign exchange market and a growing economy, and the dynamic behaviour of expected changes in exchange rates.

Within the framework of this model, there are some alternative explanations of hyper-inflationary/ high inflationary episodes. Regardless of whether fiscal or monetary policy is dominant, inflation may run into hyperinflation as an unstable phenomenon. This could happen because, in the case of a dominant fiscal policy, the real monetized fiscal deficit is too high (higher than the maximizing inflation revenue), or the economy is too far on the 'wrong' side of the Laffer curve instead of at the stable low equilibrium. In the case of a dominant monetary policy, hyper-inflation can result if the expectation adjustment is fast. In the case of a dominant fiscal policy, another interesting explanation is that the economy might be stuck at a *high stable* equilibrium. A crucial point here is that reducing the fiscal deficits is not the sole solution; only a substantial change in the financial portfolio choice (which depends on the credibility of government policies and structural reform) could 'push' the economy out of this 'high inflation trap'.

The model shows that it is possible to have the economy standing at a *low stable* inflation equilibrium in the case of a dominant fiscal policy with a slow expectation adjustment. The benefit of the expansion of output level and high economic growth in the reduction of inflation may be quite considerable, once the process of monetization of the economy is continuing. Moreover, government can now manipulate the fiscal policy and/or interest rates to keep the inflation rate at a low level.

From a policy perspective, a dominant monetary policy seems to be a better alternative, not only because it can effectively keep both inflation rates and fluctuations under control (Note that inflation now is affected by fewer variables), but also because it can prevent the economy from falling into a high stable inflation equilibrium in the first place.

An extension of the model shows that if a rise in the expected depreciation rate relative to inflation leads to a higher output growth, the stability condition for inflation equilibrium is more difficult to achieve.

As the main features of this model conform well to the characteristics of the Vietnamese economy in the 1980s as described in Chapter 2 (Section 2.2), the model can be used also to analyze the situation when the economy moved from very high inflation in the mid-1980s to a moderate and low inflation path since the market-oriented reform in 1989. More importantly, an econometric investigation of this theoretical model can help determine whether the relatively low inflation rate at present in Vietnam can be sustained into the future³³.

³³ Surprisingly, in the studies using this kind of model, no attempt was made for testing the condition for stability of inflation.

Chapter 5

The Econometric Evidence: The Determinants of

Inflation and the Condition for Stability of Inflation

5.1. The underlying determinants of inflation in the first half of the 1990s

The issue of which factors have a significant effect on inflation, deserves to be investigated more rigorously. The econometric results obtained in several studies of the recent inflationary experiences of developing countries imply that the causes of inflation vary across countries, and that there is no basis for generalization (See Dhakal and Kandil (1993), Ghatak and Deadman (1989), Hamann (1993), Lim (1987), Moser (1995), Parikh (1990), and Yang (1990)). More interestingly, in some countries experiencing moderate/low inflation, money supply has been found not to contain valuable advanced information on the change in prices over a certain span of data.

For Vietnam, an econometric analysis of the determinants of inflation since the market-oriented reform in 1989 is found only in the study by Dodsworth *et al* (1996), which estimated a polynomial lag model to examine the influence of money supply ($M2$) on inflation. It also used an error-correction model (ECM) to consider the effect of rice price on inflation. The main findings in this study are that an increase in growth of $M2$ leads to higher inflation, with contemporaneous money growth having no impact and money growth with a one- to two-month lag having the maximum

impact, and that the changes in the price of rice have a positive and significant impact on inflation in the short run.

In this chapter, we use a distributed-lag model in order to investigate the determinants of inflation rate in Vietnam in the aftermath of the 1989-reform. But our investigation is enriched by the choice of variables. Firstly, the role of the (possible) factors explaining the demand for (domestic) money is explicitly exhibited in the regression. In Dodsworth *et al* (1996), a rising trend of real money demand is reflected only in a negative constant term. Secondly, we examine the relationship not only between inflation and broad money ($M2$), but also between inflation and currency in circulation (CU), and narrow money ($M1$). This is important since Vietnam is still very much a 'cash economy'. Moreover, rigorous techniques for identifying the appropriate lag lengths of each determinant are applied rather than relying on somewhat arbitrary choice.

5.1.1. The empirical model, data description and approach to estimation

In view of the theoretical background and the statistical analysis given in Chapter 3 (Formula (6) in Sections 3.2.1 and Section 3.2.2), a distributed-lag model will be employed for the estimation.

$$\pi_t = \alpha_0 + \sum_{i=0}^{n_M} \alpha_{iM} gM_{t-i} + \sum_{i=0}^{n_Y} \alpha_{iY} gY_{t-i} + \sum_{i=0}^{n_{\pi}} \alpha_{i\pi} \pi_{t-i} + \sum_{i=0}^{n_{\pi^e}} \alpha_{i\pi^e} \pi_{t-i}^e \quad (35)$$

where π and gM , as before, are the inflation rate and the growth rate of nominal money supply respectively, gy is the growth rate of real output, ϖ is *minus* the rate of return on Dong in terms of US dollars (see Table 10, Chapter 3, Section 3.2.2); ie. ϖ is measured as the difference between the depreciation rate and the time deposit interest rate ($\varepsilon - i_d$), and π^e is expected inflation. Here, growth rate of a variable, say, X is measured as $gX = (X - X(-1))/X(-1)$ ³⁴. Note that the empirical model incorporates both current and past variables of the (possible) determinants of the inflation rate. Also, as the theory predicts the (steady state) effects, the cumulative coefficients of each determinant have the following signs³⁵:

$$\sum \alpha_{iM} > 0, \quad \sum \alpha_{iy} < 0, \quad \sum \alpha_{i\varpi} > 0, \quad \sum \alpha_{i\pi^e} > 0 \quad (36)$$

The model will be estimated for three monetary aggregates: currency in circulation CU , $M1$ defined as CU plus demand deposits, and $M2$ as $M1$ plus time deposits plus foreign currency deposits. Inflation is measured by the rate of change of the CPI. Due to the lack of a better measure of real income, the real industrial output is used as a proxy for gy . An adaptive expectation scheme is used to approximate the expected inflation rate. Accordingly, π_t^e is approximated by π_{t-1} ³⁶.

³⁴ This measure is slightly different from the measure of growth rate of X as $\Delta \log X$. Note also that the use of $\varpi = \varepsilon - i_d$ instead of $i_d - \varepsilon$ as used in Chapter 3 (Section 3.2.2) is just for convenience (see also the formula of demand for money in the theoretical model developed in Chapter 4 (Section 4.2.1)). The only difference in using $i_d - \varepsilon$ is that its coefficient in the regressions will have the opposite sign.

³⁵ This is implied from the equality of all lags of each determinant in steady state.

³⁶ This comes from the formula of adaptive expectation: $\pi_t^e - \pi_{t-1}^e = \tau(\pi_{t-1} - \pi_{t-1}^e)$ with $\tau = 1$. Thus, in our regressions, expected inflation rate is proxied by one-month lag, but expected depreciation rate is proxied by current value.

The data on inflation calculated from CPI, exchange rate, and time deposit interest rate have been provided by the CIEM. The data on nominal money supply have been provided by the SBVN. The data on real industrial output have been obtained from the GSO. All data are monthly time series which cover the period from 1990:12 to 1994:12³⁷. It is worth noting that the monthly data are, in general, consistent with the statistical consideration based mostly on the annual data and given in Chapter 3 (Section 3.2.2). In the monthly series, there is also a high positive association between π and gM (gCU , $gM1$, and $gM2$). The monthly values of ε and ϖ , averaging at 1.2% and -1.4% respectively, reflect the attractiveness of the Dong, and this fact could have an important role in lowering inflation. In fact, the average value of π was only 2.1%, whereas the average value of gCU , $gM1$, and $gM2$ was about 3.5%, 3.2%, and 2.5% per month respectively. The only inconsistency between the monthly and the annual data lies in real industrial output. The average monthly value of gy appeared to be too high, standing at 1.6% in comparison with the average annual value of about 12% for the period 1991-94 (see Table 1, Chapter 1, Section 1.1). Since the monthly series show the same trend of strong growth as the annual series during the period of estimation, the bias problem in the regression estimation due to the overestimated monthly gy may not be serious. However, the interpretation of the estimation results, especially in relation to the determinant gy , should be done with caution.

Following the methodology used in Friedman and Kuttner (1992) and in Hamann (1993), the estimation will focus on the predictive content of the determinants. That is, independently of the results of the Granger-causality tests, if lagged values of the

³⁷ In fact, we have got a longer period for the data of inflation, exchange rate, and interest rate, but the estimation is limited by the availability of the original time series of money supply and industrial output.

determinants help predict movements in prices, then these variables contain valuable information that can be used to guide policy decisions. For the estimation of Model (35), in order to assess the information provided by each determinant, but not already by the others, it is necessary to test the joint significance of the coefficients of gM , gy , ϖ , π^e . However, if the Granger-causality exists from inflation to the explanatory determinants, with the implication that the determinants are not exogenous to the change in prices, the evidence on the information content of the determinants would be weakened. To get more confidence in the further assessment of the results of the single-equation estimates, the formal causality test is also implemented (see Appendix, Part D).

Since the estimation also investigates the long-term effects of the determinants on inflation, the problem of 'spurious' regression may arise when performing regressions with the non-stationary series. But the results of the Augmented Dickey-Fuller (ADF) tests show that all series π , gM (gCU , $gM1$, $gM2$), gy , and ϖ are integrated of order zero, ie. stationary (see Appendix, Part B).

Another problem for a distributed-lag estimation is to identify the appropriate lag lengths. The lags, together with the determinants of Model (35), are chosen in accordance with a sequential procedure suggested by Hsiao (1981) (see Appendix, Part C). Since this procedure is based on Akaike's minimum final prediction error (FPE), the procedure seems to be consistent with the main focus of the estimation, namely, the predictive content of the determinants. The implementation of this procedure leads to the following model specifications to be estimated:

Table 11: The Specifications of Model (35) for the Cases of *CU*, *M1*, and *M2*

| case of <i>CU</i> | | case of <i>M1</i> | | case of <i>M2</i> | |
|-------------------|----------------------|-------------------|----------------------|-------------------|----------------------|
| ϖ | ($n_{\varpi} = 6$) | ϖ | ($n_{\varpi} = 6$) | ϖ | ($n_{\varpi} = 6$) |
| gCU | ($n_M = 1$) | $gM1$ | ($n_M = 2$) | $gM2$ | ($n_M = 3$) |
| π^e | ($n_{\pi^e} = 5$) | - | | - | |
| gy | ($n_y = 2$) | gy | ($n_y = 3$) | gy | ($n_y = 2$) |

Note: The list of determinants for each case shows the sequence of the choice according to Hsiao's procedure.

In all cases, the first choice is determinant ϖ with the same number of lags. Also, whatever the monetary aggregate used, the growth rates of money supply and real industrial output contribute to the explanation of the variation in inflation rate. However, the expected inflation, proxied by π_{-1} , does not play this role in the cases of *M1* and *M2*.

5.1.2. The estimation results and interpretation

Tables 12, 13, and 14 present the results of the OLS estimations for the specifications given in Table 11. Although there is the problem of functional form for the cases of *M1* and *M2* as Ramsey's Reset test for them is not passed, the most important tests, the tests for serial correlation and normality of the error term, for this kind of model are quite satisfactory. The Lagrange multiplier (LM) test for the three cases shows no serial correlation up to 12 lags of the residuals. The statistic of the Jarque-Bera test for normality is also highly insignificant, ie. the null-hypothesis of normality of residuals cannot be rejected. All regressions also pass the tests for structural stability under the

Cusum-sq test and the White test for heteroscedasticity based on the regression of squared residuals on squared fitted values. Also, the explanatory powers of all specifications are quite satisfactory. Moreover, the exogeneity of the determinants is not a problem within the time frame of setting lags of the determinants (see causality test in Appendix, Part D). In general, these estimations can be used for further analysis.

The three regressions share some common features. The lags of \bar{w} and gM are jointly significant at the 1% and 5% levels respectively (see the F-test for the joint significance of the lags). Thus, these determinants are very useful predictors of the variation in the inflation rate. The sums of the coefficients of the lags of \bar{w} and gM are highly significant and have positive signs. This indicates that they both have a long-lasting impact on inflation with the signs that are predicted by theory. For example, a one percentage point increase in \bar{w} (in the difference between the depreciation rate and time deposit interest rate) or growth rate of CU , other things being equal, ultimately leads to about a 0.45 or 0.23 percentage point increase in the inflation rate. At the same time, the evidence on the information content of gy is weaker, with the F-statistic for the joint significance of the lags significant only at 10% for the case of M1 only. Moreover, the sum of the coefficients of the lags of gy is not significant at the 10% level and has the wrong sign, positive³⁸. Thus, it can be said that the impact of gy on inflation, if it exists, is only of short duration.

³⁸ The same result is obtained for the case of Singapore and Korea during the period of about 1970-90. However, no explanation is given for this phenomenon (see Dhakal and Kandil 1993).

Table 12: Estimation Result: the Case of Using CU

| | | | | |
|--|-----------------------------|---------------------|-----------------------|---------------------|
| Sample period: 1990:12-1994:12, 43 observations (1991:6 - 1994:12) are used | | | | |
| Constant term: | 0.0072 (1.726)* | | | |
| Lag | $\varpi(\varepsilon - i_d)$ | gCU | $\pi_{-1}(\pi^e)$ | gy |
| 0 | 0.1630 (2.744)** | 0.1313 (2.474)** | | -0.0312 (-0.863) |
| 1 | -0.1148 (-1.613) | 0.0962 (1.639) | 0.0432 (0.259) | -0.0133 (-0.320) |
| 2 | -0.0518 (-0.757) | | 0.1079 (0.7546) | 0.0542 (1.495) |
| 3 | 0.0924 (1.520) | | 0.0675 (0.489) | |
| 4 | 0.1710 (2.613)** | | 0.2396 (2.058)** | |
| 5 | 0.1063 (1.603) | | -0.2324 (-2.388)** | |
| 6 | 0.0812 (1.238) | | 0.1503 (1.978)* | |
| Sum of the lag coefficients (Σ) | 0.4472 | 0.2275 | 0.3760 | 0.0097 |
| -Wald test for $\Sigma=0, \chi^2(1)$ | 16.438*** | 9.783*** | 6.059** | 0.010 |
| -Wald test for $\Sigma\alpha_{iM} = 1$ | | 112.787*** | | |
| F-statistic for the joint significance of the lags | F(7,24)= 4.410*** | F(2,24)= 5.162** | F(6,24)= 2.238* | F(3,24)= 2.047 |
| Other statistics | $\overline{R^2} = 0.715$ | SE=0.0090 | Max Log = 153.878 | |
| Autocorrelation (LM test, $\chi^2(12)$): 15.981 Functional Form (RESET test, $\chi^2(1)$): 2.655 | | | | |
| Normality (Jarque-Bera test, $\chi^2(2)$): 0.536 Heteroscedasticity (White test, $\chi^2(1)$): 0.824 | | | | |
| Cusum-Sq test: | | Pass | | |

Note: *, **, and *** denote significance at the 10%, 5%, and 1% levels respectively. The figures in parentheses are t-ratios; SE is standard error of the regression; MaxLog is maximum of log-likelihood

Table 13: Estimation Result: the Case of Using *MI*

| | | | |
|--|-----------------------------|--------------------------|---------------------|
| Sample period: 1990:12-1994:12, 43 observations (1991:6 - 1994:12) are used | | | |
| Constant term: | 0.0109 (2.786)** | | |
| Lag | $\varpi(\varepsilon - i_d)$ | gMl | gy |
| 0 | 0.1220 (1.871)* | 0.0419 (0.769) | -0.0173 (-0.475) |
| 1 | -0.0618 (-0.794) | 0.0979 (1.942)* | 0.0333 (0.812) |
| 2 | -0.0784 (-1.098) | 0.1050 (1.865)* | 0.1079 (2.721)** |
| 3 | 0.0236 (0.323) | | 0.0494 (1.608) |
| 4 | 0.1990 (3.036)*** | | |
| 5 | 0.1574 (2.397)** | | |
| 6 | 0.1570 (2.562)** | | |
| Sum of the lag coefficients (Σ) | 0.5187 | 0.2448 | 0.1732 |
| -Wald test for $\Sigma=0, \chi^2(1)$ | 37.789*** | 11.846*** | 2.599 |
| -Wald test for $\Sigma\alpha_{iM} = 1$ | | 112.772*** | |
| F-statistic for the joint significance of the lags | F(7,28)= 10.153*** | F(3,28)= 4.115** | F(4,28)= 2.328* |
| Other statistics | $\overline{R^2} = 0.668$ | SE=0.0098 MaxLog=147.300 | |
| Autocorrelation (LM, $\chi^2(12)$): 12.790 Functional Form (RESET, $\chi^2(1)$): 13.123*** | | | |
| Normality (Jarque-Bera, $\chi^2(2)$): 0.067 Heteroscedasticity (White, $\chi^2(1)$): 0.179 | | | |
| Cusum- Sq test: | | Pass | |

Note: *, **, and *** denote significance at the 10%, 5%, and 1% levels respectively. The figures in parentheses are t-ratios; SE is standard error of the regression; MaxLog is maximum of log-likelihood

Table 14: Estimation Result: the Case of Using $M2$

| | | | |
|--|-----------------------------|--------------------------|----------------------|
| Sample period: 1990:12-1994:12, 43 observations (1991:6 - 1994:12) are used | | | |
| Constant term: | 0.0114 (2.575)** | | |
| Lag | $\varpi(\varepsilon - i_d)$ | $gM2$ | gy |
| 0 | 0.1006 (1.364) | 0.0872 (1.084) | -0.0263 (-0.7007) |
| 1 | -0.1250 (-1.699)* | 0.0379 (0.503) | 0.0073 (0.168) |
| 2 | -0.0353 (-0.491) | 0.1259 (1.631) | 0.0687 (1.826)* |
| 3 | 0.0307 (0.419) | 0.0862 (1.297) | |
| 4 | 0.1966 (2.613)** | | |
| 5 | 0.0985 (1.444) | | |
| 6 | 0.1715 (2.264)** | | |
| Sum of the lag coefficients (Σ) | 0.4377 | 0.3371 | 0.0497 |
| -Wald test for $\Sigma=0, \chi^2(1)$ | 19.334*** | 10.043*** | 0.248 |
| -Wald test for $\Sigma\alpha_{iM} = 1$ | | 38.835*** | |
| F-statistic for the joint significance of the lags | F(7,28)= 7.571*** | F(4,28)= 2.834** | F(3,28)= 2.071 |
| Other statistics | $\overline{R^2} = 0.631$ | SE=0.0103 MaxLog=145.026 | |
| Autocorrelation (LM, $\chi^2(12)$): ..11.038 Functional Form (RESET, $\chi^2(1)$): 4.137** | | | |
| Normality (Jarque-Bera, $\chi^2(2)$): 0.269 Heteroscedasticity (White, $\chi^2(1)$): 0.281 | | | |
| Cusum- Sq test: | Pass | | |

Note: *, **, and *** denote significance at the 10%, 5%, and 1% levels respectively. The figures in parentheses are t-ratios; SE is standard error of the regression; MaxLog is maximum of log-likelihood

Also, in all three cases, the inflation rate is not proportional to the growth rate of money supply. The Wald test shows that the sum of the coefficients of the lags of gM is not equal to one (in fact, much lower than one and even lower than the long-term effect of ϖ). Once again, this confirms the very important role of the financial portfolio choice by the public in favour of domestic currency in slowing down inflation over the estimation period, 1991-94.

At the level of individual lags, the currency growth, gCU , has an immediate and statistically significant impact on increases in inflation, whilst the impact of the growth of narrow money, $gM1$, has a lag of one to two months. For the case of changes in broad money, $gM2$, the lagged impact is up to two months and to a less significant degree (at 12% level). Thus, when the cost of holding money (ϖ) is included explicitly in the regression, the impact of $gM2$ on inflation is weaker than the result in the study by Dodsworth *et al* (1996). In general, the lag length of impact of money supply is short, and hence, a restrictive monetary policy, particularly in terms of CU and $M1$, would quickly bring down inflation.

The inflation rate is also sensitive to short lags of ϖ ; especially in the case of CU , but the maximum impact of ϖ appears in the interval of four to six months. This suggests that the attempts to make the Dong attractive through interest rate/exchange rate policies should be sustained in order to be effective in reducing inflation.

With regard to gy , the current impact is negative, as expected, but not significantly different from zero. At the same time, the later significant (much less significant for

the case of CU lags are positive ones. This could mean that the change in the real industrial output may not be quite appropriate as a proxy for real income. However, on the face of it, the result suggests an interesting explanation. Although an immediate increase in the supply of industrial goods might have had a small (but not significant) impact on the inflation reduction, this contribution could not offset the effect of an increase in the supply of credit, which is an underlying determinant of industrial output expansion. This result is particularly important in Vietnam, where the industrial sector is dominated by the SOEs, and the SOEs still have a close relationship with the state-owned banks which dominate the banking system.

Only the regression with the use of CU contains the expected inflation, π^e , as a determinant of the inflation rate. It is clear from Table 12 that π^e is also a useful predictor of the inflation rate. Also, this determinant has a long-lasting positive impact on the inflation rate, as expected. The fact that people may hold durable goods instead of Dong, seems to be not a very convincing explanation for the whole period under consideration (see Chapter 3, Section 3.2.2). As π^e is proxied by π_{-1} , the more probable explanation could be the so-called problem of 'inflation inertia'³⁹. Although the degree of inflation inertia fell after stabilization, people still expect inflation to continue once it gets under way again.

The next important step is to determine which of the three monetary aggregates (CU , $M1$, $M2$), together with their specifications of Model (35), contains the *most* valuable information on the inflationary movement. The assessment is usually based on two

³⁹ In a dynamic sense, the long-lasting multipliers of ϖ and gCU are now equal to $0.4472/(1-0.3760)=0.7167$ and $0.2275/(1-0.3760)=0.3646$ respectively.

kinds of measures: the 'goodness-of-fit' indicators of the regressions (the adjusted- R^2 , the maximum-log of the likelihood function, and the standard error of regression) and/or the measure of the ability of the regression to forecast well (the root-mean-square forecast error, RMSFE). According to the 'goodness-of-fit' indicators, as shown in Tables 12, 13, and 14, the best result for the inflation equation is obtained when *CU* is used as the relevant monetary aggregate. But Table 15, in which the RMSFEs are computed over two ex-post forecasting periods, shows that the specification with the use of *M1* outperforms the other two specifications. The assessment in both cases is consistent with the fact that Vietnam is still very much a cash economy and an underbanked country.

Table 15: Ex-post Forecasting RMSFEs

| Specification of Model (35) | Forecasting period | |
|-----------------------------|--------------------|------------------|
| | 1994:3 - 1994:12 | 1994:6 - 1994:12 |
| - CU | 0.00696 | 0.00552 |
| - M1 | 0.00682 | 0.00449 |
| - M2 | 0.00908 | 0.00521 |

5.2 The condition for stability of inflation

The condition for stability of inflation is understood in the sense of the theoretical model developed in Chapter 4 (Section 4.2). A steady state inflation equilibrium is stable if $1 - \lambda\gamma > 0$ or $1 - (\lambda\gamma + \eta_{my}\zeta) > 0$ (when the output significantly depends on the expected real exchange rate), where γ reflects the impact of the opportunity cost of holding domestic money (measured as $\varepsilon^e - i_d$) on the demand for money; η_{my} is the

income elasticity of money demand (Equation (13)); λ is the adjustment coefficient in the equation of dynamic expectation (Equation (14)); and ζ indicates the impact of the change in the expected real exchange rate on output growth (Equation (34)). The estimated values of these parameters will be determined from the regressions similar to Equations (13), (14), and (34) in Chapter 4 (We ignore writing the error terms in the regressions for simplicity):

$$\log m_t = \text{const} + \eta_{my} \log y_t - \gamma \bar{\omega}_t \quad (37)$$

$$\Delta \varepsilon_t = \text{const} + \lambda (\pi_{t-1} - \varepsilon_{t-1}) \quad (38)$$

$$gy_t = \text{const} + \delta (\varepsilon - \pi)_t + \delta_1 gy_{t-1} + \delta_2 gy_{t-2} \quad (39)$$

Most symbols of the variables are already described in Section 5.1. Remember only that operator \log means natural logarithm and m (cu , $m1$, $m2$) is real money, ie. the nominal money M (CU , $M1$, $M2$) deflated by the CPI. In fact, the equation of demand for money here is derived from the formula $m = Ay^n \exp(-\gamma \bar{\omega})$, where A is constant. The choice of two lags of the growth rate of output in (39) will be explained later, but as this is a dynamic equation, $\zeta = \delta / (1 - \delta_1 - \delta_2)$. The estimation of these regressions will be undertaken using the same time series described in Section 5.1. And again, the expected depreciation rate is proxied by the current rate.

It is worth noting some important points in checking the condition for stability of inflation imposed on the estimated parameters. First, because the observed inflation rate is only transitional, by checking the stability condition, we can answer the question whether the actual inflation tends to be stable. Second, the regression

estimations should be acceptable in terms of several econometric tests; in particular the structural stability of the parameters is essential.

Although our focus is on the stability condition of inflation, the regression estimations will also give us more confidence in assessing the credibility of government policies and the process of economic reform as a whole.

5.2.1. Demand for money in Vietnam in the first half of the 1990s.

The estimation of the Model (35) of inflation suggests that the real output y , the opportunity cost of holding money $\bar{\omega}$, and possibly π^e could be important determinants of money demand. However, this does not mean that the demand for money is well behaved over the sample period from 1990:12 to 1994:12. Equation (37) represents the long run relationship in demand for real balances. Cointegration techniques (Appendix, Part A.1) are therefore used.

As shown in Appendix (Part B), the unit root tests are satisfied for further cointegration tests: all nonstationary variables $\log cu$, $\log m1$, $\log m2$ and $\log y$ are integrated of order 1, ie $I(1)$; the opportunity costs $\bar{\omega}$ and expected inflation rate $\pi^e = \pi_{-1}$ are stationary, ie. $I(0)$. Thus, we can examine the long run relationship between real money demand and other variables by running cointegration regression. Since the inclusion of π^e and/or the time trend do not improve the results and the focus is on $\bar{\omega}$ as suggested by the preliminary analysis in Chapter 3 (Section 3.2), we only

summarize the cointegration test in Table 16 for the OLS regressions of the log of real money on $\log y$ and ϖ .

Table 16: Money Demand: Cointegration Regressions

| | <u>Constant</u> | <u>$\log y$</u> | <u>$\varpi = \varepsilon - i_d$</u> | <u>$\bar{R}^2$</u> | <u>D-W</u> | <u>error $\in I(0)$?</u> |
|----------------------------------|-----------------|----------------------------|--|-------------------------------|------------|-------------------------------------|
| Sample period: 1990:12 - 1994:12 | | | | | | |
| $\log cu$ | 1.562 | 1.260 | 0.736 | 0.777 | 0.509 | no |
| $\log m1$ | 2.756 | 1.136 | 0.627 | 0.788 | 0.503 | no |
| $\log m2$ | 7.170 | 0.621 | 0.713 | 0.803 | 0.762 | no |
| Sample period: 1990:12 - 1992:9 | | | | | | |
| $\log cu$ | 9.219 | 0.181 | -0.107 | 0.292 | 0.691 | no |
| $\log m1$ | 9.244 | 0.220 | -0.063 | 0.245 | 0.636 | no |
| $\log m2$ | 9.297 | 0.320 | 0.556 | 0.318 | 0.906 | no |
| Sample period: 1992:10 - 1994:12 | | | | | | |
| $\log cu$ | 1.326 | 1.291 (9.948)*** | -2.972 (-1.729)* | 0.789 | 1.279 | yes |
| $\log m1$ | 3.219 | 1.073 (10.988)*** | -2.596 (-2.006)* | 0.820 | 1.424 | yes |
| $\log m2$ | 8.380 | 0.459 | -1.172 | 0.800 | 1.406 | no |

Note: - See the ADF tests for residuals from cointegration regressions in Appendix (Part B). The error term for the case of $\log m1$ over 1992:10-1994:12 is stationary only at the 10% significance level. Since ADF tests are sensitive to the time length, they are also conducted for $\log cu$, $\log m1$, $\log m2$, and ϖ over 1992:10-1994:12 and the results (not shown here) are that $\log cu$, $\log m1$, and $\log m2 \in I(1)$ and $\varpi \in I(0)$.
- The only standard t-statistics for the cases of existence of cointegration are shown for the purpose of calculating confidence intervals. D-W is the Durbin-Watson statistic.

The low Durbin-Watson statistics for three regressions over the whole sample from 1990:12 to 1994:12 signal noncointegration. This is confirmed by the ADF tests for

stationarity on the series of residuals. Thus, the long-run demand for real balances does not exist. A question, then, arises: has the demand for money behaved well enough since 1992? This point of time is chosen because of two main factors. First, the market-oriented reforms since then have gone ahead after the temporary reversal of reforms in 1990-91. Second, the financial environment has become more stable. The choice of a particular month is based on the empirical regressions, which show the best broken point is October of 1992.

As presented in Table 16, the cointegration regressions for the cases of $\log cu$ and $\log ml$ over the period from 1992:10 to 1994:12 look quite reasonable. They have the right signs in the explanatory variables and a higher than one income elasticity as expected. The ADF tests on the regression residuals confirm the existence of the long run demand for real balances. Moreover, the elasticities of demand for money with respect to ϖ are quite high. Since $\partial \log m / \partial \log \varpi = (\partial \log m / \partial \varpi) : (\partial \log \varpi / \partial \varpi) = (\partial \log m / \partial \varpi) * \varpi = (\text{coefficient of } \varpi) * \varpi$ where m is real money balances, for a ϖ of 1% (ie the difference between the depreciation rate and the time deposit interest rate is 1%), the elasticities of demand for cu and ml with respect to ϖ are -0.030 and -0.026. This confirms the large shift towards the Dong since 1992 as we have seen in Chapter 3 (Section 3.2.2). However, the long run demand for real MI is still weakly established since the null hypothesis of unit root for the residuals from the cointegration regression is rejected only at the 10% significance level. And again, Table 16 shows that there is no cointegration for the case of $\log m2$ over 1992:10 - 1994:12, and all the regressions over 1990:12 - 1992:9 are 'spurious'.

In the cointegration regressions, the standard t-statistics and the test for structural changes may create problems because the standard errors may be misleading. To get more confidence in the use of the estimated parameters from the acceptable cointegration regressions, we will estimate the ECMs representing the short-run dynamics of the demand for *cu* and *m1*. This can be done since there exists the long run demand for *cu* and *m1* over 1992:10 - 1994:12. The expectation is that the correct sign of the coefficient of the error-correction term should be significant and the short-run dynamics should pass the test for structural stability. The following ECM is chosen for the estimation:

$$\log m_t = \text{const.} + \beta_1 \Delta \log y_t + \beta_2 \Delta \varpi_t + \beta_3 \Delta \varpi_{t-1} + \beta_4 \text{resm}_{t-1} + v_t \quad (40)$$

where *resm* represent residuals from the corresponding cointegration regression.

Table 17 contains the results of the OLS estimations. Only the sign of the coefficients of *resm*(-1) requires some explanation. Since the variable *resm* is measured as the difference between actual values and fitted values, the negative coefficients mean that if real money stock is above that consistent with the desired long-run holding, real money demand should be decreased. In terms of the signs and significance of the coefficients, the explanatory power, the diagnostic tests, and test for structural stability, the ECM is quite good for representing the short-run dynamics of demand for *cu*. The case of *logm1* presents a problem in the test for normality of residuals because the test statistic is significant. However, the level of significance is only at 10%.

Table 17: The Estimation of the ECMs for Demand for Money

(Sample period: 1992:10 - 1994:12)

| $\log m =$ | $\log cu$ | $\log ml$ |
|---------------------------------|-----------------------|-----------------------|
| Constant | 0.019 (5.148)*** | 0.014 (2.852)*** |
| $\Delta \log y$ | 0.266 (3.876)*** | 0.397 (4.375)*** |
| $\Delta \bar{w}$ | -2.639 (-5.167)*** | -1.821 (-2.870)*** |
| $\Delta \bar{w}(-1)$ | -1.105 (-3.933)*** | -0.884 (-2.408)** |
| $resm(-1)$ | -0.241 (-3.570)*** | -0.420 (-3.795)*** |
| R-bar-squared | 0.729 | 0.563 |
| Overall F-test $F(4,21)=$ | 17.829*** | 9.047*** |
| S.E. of regression | 0.018 | 0.024 |
| <i>Diagnostic tests:</i> | | |
| Serial correlation $\chi^2(12)$ | 8.493 | 14.281 |
| Functional form $\chi^2(1)$ | 0.290 | 1.033 |
| Normality $\chi^2(2)$ | 3.752 | 4.731* |
| Heteroscedasticity $\chi^2(1)$ | 0.164 | 0.005 |
| Cusum-sq test | pass | pass |

Note: The figures in parentheses are t-ratios. All diagnostic tests are as before (see, for example, Tables 12,13 or 14)

As the long run equation of demand for real currency in circulation since the end of 1992 is acceptable, the estimated parameter γ can be considered to be equal to 2.972 (see Table 16). When the money is taken as narrow money, $\gamma = 2.596$. However, the case of narrow money is only presented for the purpose of comparison because the existence of cointegration is very weak. The question of inflation stability now depends on the results from the estimation of Equations (38) and (39).

5.2.2. A check on the condition for inflation stability

Equation (38) is firstly run by the OLS method for the whole sample period and the results are presented in Table 18. The estimated coefficient of $(\pi-\varepsilon)_{-1}$ has the right sign, positive, and is highly significant. The interpretation in terms of econometric tests, however, is misleading because the hypothesis of normality of the error term is strongly rejected. Moreover, the Cusum-sq test shows that the 95 per cent confidence interval is broken over the wide range, from the end of 1991 to the end of 1993. This means that there is a very high probability of systematic shifts in the estimated parameters. However, attempts to introduce dummies on the basis of the period of institutional changes have not altered the results.

As in the case of money demand, we ask whether there exists a time span where the estimation of Equation (38) is stable. It is found that this time span has existed since 1993:10. As also shown in Table 18, the estimation of Equation (38) over 1993:10 - 1994:12 passes the test for structural stability, and, given a very small number of observations, the regression is quite acceptable in terms of other tests, the sign and significance of the explanatory variable (though only at the 10% level). In fact, the structural instability mostly occurred in the period before 1993:10 (see also the estimation for the period from 1990:12 to 1993:9). The estimations support the significant and positive association between the change in the depreciation rate and the deviation of inflation from the depreciation rate. That is, λ is positive and significant. Also, λ declined over time, from 0.361 to 0.108. Since λ reflects the people's rate of response to the changes in inflation, a decrease in the value of λ would be expected as

inflation is decreased. However, we can use the estimated coefficient only for the period since October 1993 with $\lambda = 0.108$.

Table 18: Dynamics of (Expected) Depreciation Rate and the Estimation

| Sample period | Dependent variable: $\Delta \varepsilon$ | | |
|--------------------------------|--|-----------------------|---------------------|
| | 90:12 - 94:12 | 90:12 - 93:9 | 93:10 - 94:12 |
| Constant | -0.004 (-0.873) | -0.004 (-0.698) | -0.001 (-1.317) |
| $(\pi - \varepsilon)(-1)$ | 0.352 (3.032)*** | 0.361 (2.529)** | 0.108 (1.892)* |
| R-bar-squared | 0.146 | 0.141 | 0.156 |
| Overall F-test | F(1,47)=9.196*** | F(1,32)=6.397** | F(1,13)=3.581* |
| S.E. of regression | 0.030 | 0.036 | 0.003 |
| <i>Diagnostic tests:</i> | | | |
| Serial Correlation | $\chi^2(12) = 17.265$ | $\chi^2(12) = 12.441$ | $\chi^2(1) = 1.620$ |
| Functional Form $\chi^2(1)$ | 0.046 | 0.048 | 1.093 |
| Normality $\chi^2(2)$ | 27.339*** | 4.088 | 1.573 |
| Heteroscedasticity $\chi^2(1)$ | 0.124 | 0.681 | 0.038 |
| Cusum-sq test | not pass | not pass | pass |

Note: The figures in parentheses are t-ratios. All diagnostic tests are as before.

Now we estimate the last equation, Equation (39), for the whole sample period. Since the current output depends on its previous situation, naturally the lags of dependent variable gy should be used as predetermined variables in the (OLS) regression. Initially, all lags from gy_{-1} to gy_{-6} are put into the regression. But only the coefficients of the first two lags are significant and the F-test of joint zero restriction on the

coefficients of lags from gy_3 to gy_6 is highly insignificant ($F(4,34) = 0.651$)⁴⁰. As a result, Equation (39) is chosen and its (OLS) estimation is presented in Table 19.

Table 19: Effect of the Change in Real Exchange Rate on Output Growth gy
(Sample period: 1990:12-1994:12; 46 observations (91:3-94:12) are used)

| Dependent variable: gy | | | |
|--|---------------------------------------|----------------------------|----------------------------|
| <u>Constant</u> | <u>$\varepsilon - \pi$</u> | <u>$gy(-1)$</u> | <u>$gy(-2)$</u> |
| 0.037 | 0.494 | -0.592 | -0.226 |
| (4.439)*** | (2.146)** | (-4.945)*** | (-1.926)* |
| R-bar-squared = 0.340 ; Overall F-test: $F(3,42) = 8.743^{***}$; S.E. = 0.051 | | | |
| Serial correlation | $\chi^2(12) = 8.834$ | Functional form | $\chi^2(1) = 0.797$ |
| Normality | $\chi^2(2) = 1.111$ | Heteroscedasticity | $\chi^2(1) = 0.332$ |
| Wu-Hausman test | $F(1,41) = 0.354$ | Cusum-sq test: | Pass |

Note: The figures in parentheses are t-ratios. The Wu-Hausman test involves augmenting the regression with the residuals from the regression of each of the regressors suspected of endogeneity (In our case, variable $\varepsilon - \pi$) upon the set of available instruments. Here we use $(\varepsilon - \pi)_t$ and gy_t and then testing the joint significance of these added residuals by using the F-test (In our case, we can just look at the t-statistic because there is only one regressor suspected of endogeneity). Other diagnostic tests are as before.

The Wu-Hausman test for exogeneity of the regressors is also included, together with other ‘standard’ diagnostic tests. Because output may have an effect on depreciation rate, there is potential for $\varepsilon - \pi$ to be endogenous and hence, the estimates would not be consistent (In Section 5.1.1, we only undertook the test for causality between gy and inflation rate). But the Wu-Hausman test shows that variable $\varepsilon - \pi$ can be regarded as

⁴⁰ There are 4 restrictions and the regression which has 7 explanatory variables, uses 42 observations from 1991:7 to 1994:12, therefore the F-statistic should be compared to the critical value with 4 and 34 (42-7-1) degrees of freedom.

exogenous. The estimation results are highly acceptable (The negative coefficients of the lags of gy indicate the cycles of (industrial) output growth). Parameter ζ in Equation (34) (Chapter 4, Section 4.2) now can be estimated $\zeta = 0.494/(1+0.592+0.226)=0.272$, and this value can be taken to represent the whole sample period.

Table 20 shows that the condition for inflation stability is satisfied ($1-\lambda\gamma > 0$ or $1-(\lambda\gamma + \eta_{my}\zeta) > 0$). But, of course, this result is valid only for the period since October 1993; before then the value of the parameter λ is not acceptable. Moreover, the observed inflation rate has been at relatively low levels and the nominal exchange rate has continued to be rather stable even in 1995 and 1996. This rules out the possibility that the economy could be on the 'wrong side' of the inflation-seigniorage Laffer curve⁴¹ and hence, the actual inflation in recent years has tended to be stable.

Table 20: Checking the Conditions for Stability of Inflation

| <u>Case</u> | γ | η_{my} | λ | ζ | $1 - \lambda\gamma$ | $1 - (\lambda\gamma + \eta_{my}\zeta)$ |
|-------------|----------|-------------|-----------|---------|---------------------|--|
| CU | 2.972 | 1.291 | 0.108 | 0.272 | 0.679 | 0.328 |
| M1 | 2.596 | 1.073 | 0.108 | 0.272 | 0.719 | 0.428 |

How confident can we be that inflation in Vietnam has been stable since October 1993? To get some idea about this, we calculated the 90 per cent confidence intervals of the estimated parameters γ (the case of using *CU* in demand for money) and λ : they

⁴¹In the framework of the model developed in Chapter 4, even when the condition for inflation stability is met, inflation may run into hyperinflation if the economy is far enough on the 'wrong' side of the Laffer curve.

are $(-5.913, -0.030)$ and $(0.007, 0.209)$ respectively⁴². If these parameters are highly independent, the 'worst scenario' may happen: γ is too close to 5.913 and λ to 0.209, and then $\gamma\lambda \approx 1.236$. Obviously, whatever the values of other parameters, the condition for inflation stability is not satisfied then. Thus, this condition is only satisfied 'on average', but not firmly established yet.

The overall estimation procedure is consistent with what happened during the transitional period in the first half of the 1990s. There were substantial institutional changes, but the path of the economic reforms was not smooth, sometimes characterized by stop-and-go policy. The examples are the temporary reverse of the reforms during 1990-91 and the fact that the reform process of the SOE sector and the banking system has been slow in comparison with overall economic development. All this occurred in the context of a population suffering for several years in the mid-1980s from the negative consequences of macroeconomic mismanagement. As a result, there should be systematic shifts in money demand, credibility and expectation. For the whole period, therefore, it is to be expected that long run relationships between real money, real output, and opportunity costs cannot be obtained, and that the parameter reflecting the adjustment in adaptive expectation is subject to frequent changes.

We found that there has existed only long run demand for real currency in circulation (and for real narrow money, although with the much weaker econometric evidence) since the end of 1992. A stable regression for the dynamics of the expected exchange

⁴²The confidence interval can be obtained as $(x - t_c s_x, x + t_c s_x)$ where x is the estimated regression parameter, s_x is the estimates of its standard error, and t_c is the t-distribution critical value corresponding to the regression degree of freedom and the probability of the true parameter falling into the confidence interval.

rate has existed only since the end of 1993. This may reflect the fact that the 'credibility gap' among the people with regard to government policies has recently been narrowed. The process towards financial stability has started, but has not been firmly established. The degree of confidence in a stable financial environment is not high. Even in the case of real currency in circulation, the evidence in favour of the existence of cointegration cannot be considered strong because of the limitation of the test power due to the very short time series.

Summary

This chapter has investigated two questions: what are the major determinants of the inflation rate in Vietnam since the market-oriented reforms? Has the inflation in recent years tended to be stable?

The investigation of the first question relied on a simple monetarist model (Chapter 3, Section 3.2.1) which explains the inflationary movement as a result of the changes in money supply and the factors determining the demand for real balances. The monetarist model fits monthly data from December 1990 to December 1994 reasonably well. Both money growth and the rate of return on Dong in terms of US dollars circulating in the economy (Recall that it is measured as $i_d - \varepsilon = -\bar{\omega}$) contain valuable information on the behaviour of inflation, and both have a significant and expected long-term impact on the inflation rate. The econometric analysis, thus, reconfirms the intuition behind the descriptive statistics in Chapter 3 (Section 3.2.2), that the key role in affecting the inflation rate is that played by money growth and

especially, the factors reflecting the attractiveness of the Dong⁴³. Moreover, the inflation rate is sensitive to short lags of both money growth and $\bar{\omega}$, but in the latter case, its maximum impact appears in the interval of four to six months. The investigation also indicates that the significant positive impact of the expansion of (industrial) output on inflation is only of short duration.

The answer to the question of inflation stability is based on the estimations of several parameters characterizing the demand for (domestic) money, the expectation of depreciation, and output growth, that established, together with the public finance-seigniorage relationship, the theoretical model in Chapter 4 (Section 4.2). We found that the condition for inflation stability has been met since the end of 1993, and hence, the rather low inflation in recent years has tended to be stable. However, the process toward financial stability has not been firmly established. Moreover, our investigation reflects the rapid institutional changes and the weak credibility of the pace of the financial and SOE reforms during the first half of the 1990s. Thus, the inflation dynamics since the 1989-reform should be analyzed largely on a case-by-case basis.

The investigation of both questions suggest that, at present, currency in circulation *CU* or, perhaps, narrow money *M1*, is the 'best' choice for an intermediate target. This is because these monetary aggregates contain the most useful predictive information on inflationary movement. Furthermore, there is recent evidence in favour of the structural stability and the actual long run relationship of the real demand for these monetary aggregates.

⁴³ Thus, in the sense of the impact of growth of money (*M2*) on inflation, our result is consistent with the study by Dodsworth *et al* (1996). However, in our estimations, which explicitly took the opportunity costs of holding money into account, the effect of money growth on inflation is much weaker

Chapter 6

An Assessment of the Appropriate

Anti-inflation Policy for Vietnam

6.1. Inflationary target

The social and economic benefits gained by Vietnam in the first years after the market-oriented reform in 1989 have been significant. In order to sustain the achievements, particularly the improved resource allocation and high economic growth, efforts to stabilize the economy will continue to be very important. The outcome of these efforts, of course, largely depends on the ability to control money supply and the policy choice in regard to other macroeconomic variables such as fiscal (public) deficits, interest rates, and exchange rates. But the first thing the government should do in this respect, is to make a firm commitment to low inflationary growth.

As inflation surged in 1990 and 1991, in December 1991, inflation control was again declared the priority policy objective to the year 1995. It is pleasing to see that since then, together with the success in slowing down inflation, Vietnam has been always regarding price stabilization as one of the priorities in macroeconomic management. However, the commitment to the goal of low inflation sometimes seems to weaken. For example, after the failure to keep the inflation rate at a single-digit level in 1994 and 1995, following a record low of 5.2% in 1993, Vietnam assessed that with the

high economic growth, an annual inflation rate at a moderate double-digit level is acceptable economically. There was also the suggestion that the government needs to keep the inflation rate not higher than double that of the GDP growth rate (Le Dang Doanh 1995).

There are some reasons behind the weakening of commitment to the goal of low inflation (say, at about 10 per cent per year or lower). During the transitional period, the government is under constant pressure to increase public spending (salaries, expenditure on infrastructure and social services) and credit to the SOEs. It is also believed that inflation is inevitable in a growing developing economy like Vietnam, and more importantly, that moderate inflation does not negatively affect economic growth. At the same time, there is the fear that moderate inflation can be reduced only at a substantial short-term cost⁴⁴.

At present, however, any relaxation of the commitment to keep inflation under control may hurt the stabilization efforts in several aspects. Firstly, this may result in macroeconomic mismanagement. Once 'the worst' is seemingly over, public deficits may again increase out of control and hence, lead to an unnecessary easing of fiscal and monetary policy. Secondly, any relaxation of the commitment to anti-inflation may alter the structural parameters of the money demand functions, and the dynamic expectations of the depreciation rate, the stability and the predictability of which, as seen in Chapter 5 (Section 5.2), have just started forming. As a result, inflation could again become unstable within a very short period. Thirdly, relaxing the anti-inflation

⁴⁴In Dornbusch and Fischer (1993), annual inflation in the range of 15 to 30 percent is defined as moderate inflation.

commitment, together with widening the trade deficit, encourages speculation over the value of the Dong, which in turn could lead to a higher expected depreciation and hence, higher inflation due to a portfolio shift against the Dong (see also Chapter 5)⁴⁵.

Dornbusch and Fischer (1993) present some cases where economies can grow for a rather long time with moderate inflation after having reduced the inflation rate from a high level. But the risk of crises is also high, particularly for an open economy (Mexico is a typical example) since a moderate inflation rate cannot sustain a stable nominal exchange rate over time. On the other hand, depreciation may create a 'vicious circle': depreciation may lead to higher inflation, and this requires a more depreciated domestic currency. Korea during 1980-81 illustrates the case where disinflation from a moderate to a single digit range was accompanied by a significant cost to output. But it is also true that Indonesian efforts to bring inflation down to single digit levels, firstly from high inflation in 1968, and then from moderate inflation during 1974-76, involved apparently low output cost. Success usually is achieved in combining mostly orthodox monetary and fiscal policies with some exchange rate commitment, and taking advantage of favourable supply shocks (for example, the 'oil boom') (Dornbusch and Fischer 1993).

It is well established that high inflation involves substantial costs to the economy. In times of high inflation, relative prices are highly variable; the volatility of inflation itself is high; information on prices and the ensuing uncertainty become highly

⁴⁵The trade deficit in 1996 was expected to be US\$4.0 billion, the highest ever and up sharply from US\$2.3 billion in 1995. In November of 1996, Vietnam had to move to dampen speculation over a devaluation of the Dong by stating that a devaluation of the Dong was not being planned and the authorities wanted to manage the Dong, ensuring reasonably stable rates against other currencies (Reuters News Service, November 1996).

problematic; and the credit selection process is destroyed. High inflation, therefore, is the major source of resource misallocation and also brings about a major redistribution of wealth. Output growth is negatively associated with high inflation and high inflation is not consistent with sustained growth (Barro 1995 and Fischer 1993).

Meanwhile, the study of a sample of 127 countries over the period 1961-92 by Bruno and Easterly (1995) shows that if the countries with high inflation crises are excluded, there is no evidence of any consistent relationship between growth and inflation at any frequency⁴⁶. But this does not mean that low-to-moderate inflation is not very costly as it was believed for a long time (For example, the classical measurement by Bailey (1956) led to the cost being identified with 'boot leather', thus being small). New studies have provided evidence that even relatively low and anticipated inflation might impose substantial costs, particularly welfare costs (Parkin 1994: xiv). Moreover, the economic achievements of the East Asian countries demonstrate vividly the contribution of macroeconomic stability with low inflation to growth. By and large, East Asia managed to keep inflation at single - digit levels (Leipziger and Thomas 1993).

Whether the time period is short- or long-run, the commitment to lowering inflation rates is desirable. In the first years after 1989, better resource reallocation due to the market-oriented reform was seen to be the most important factor contributing to economic growth. Now is the time for a more stable macroeconomic environment to

⁴⁶They define high inflation crises as periods when inflation is above 40 percent annually.

play its role. Of course, making a commitment is only the beginning. The inflationary target can be achieved only when the state priority is indeed reflected in real policies.

6.2. The SBVN, monetary instruments, and monetary target

The ability to control the money stock, in which the SBVN plays a central role, is another crucial element in combating inflation. In this regard, as described in Chapter 3 (Section 3.1), the SBVN is still subject to two main limitations. First, although the 1990-law on banking authorized the SBVN to assume traditional central bank functions, the SBVN still operates under the government's guidance in policy matters. Second, the lack of development in the financial sector creates difficulties in the use of the monetary instruments to control effectively money stock without negatively affecting the efficient allocation of financial resources. In an open economy, as the exchange rate becomes more flexible, the monetary authorities will have more scope for controlling domestic monetary development. Another problem for the conduct of monetary policy, thus, is to decide which monetary aggregate should be targeted.

Making the SBVN a much more independent agency in reality, with the responsibility for maintaining price stability is an important step in strengthening the government's credibility. Central bank independence is advocated as a very desirable remedy against inflation⁴⁷. One well-known argument is that this independence would reduce the risk

⁴⁷ Central bank independence is usually based on 'political' independence and 'economic' independence. For example, according to the Grilli measure, political independence is determined by: 1. the procedures for appointing board members; 2. the relationship between the governing board of the central bank and the government; 3. formal responsibilities for monetary policy; economic independence is determined by the influence of the government in deciding how much to borrow from the central bank and the nature of the monetary instruments under control of the central bank (De Haan and Sturm 1992). The study by Cukierman *et al* (1992) shows that among developing countries, however, legal independence is not very important and not a statistically significant determinant of

of the government exploiting the central bank capacity to create 'easy money' through seigniorage to finance the public deficit. This is especially common in developing countries and economies in transition. Also, as predicted by our theoretical model (Chapter 4, Section 4.2.2) where monetary policy dominates fiscal policy, an independent central bank is much more powerful in controlling and stabilizing inflation at low levels, particularly when the expectation adjustment is slow, or in other words, when the condition for inflation stability is met. Moreover, in a recent empirical study of more advanced countries, De Haan and Sturm (1992) came to the conclusion that an independent central bank yields lower inflation rates without making economic sacrifices such as lower output. For developing countries, Roubini and Sala-i-Martin (1992) also found that in the presence of financial repression, inflationary revenue is one potential element affecting growth negatively.

The ideal model, which ensures the independence of a central bank in its mandate to pursue price stability as the primary objective of monetary policy, usually centers on two main guidelines: first, all credit to the government is discretionary; second, only indirect credit is allowed (see Table 21). It also suggests that parliamentary control over central bank credit to the government should be discouraged (Cottarelli 1993).

In Vietnam, as in many developing countries, the banking system is still thin, inefficient, and inflexible, and the government paper market is not sufficiently well organized; therefore some limited access to direct central bank credit may be unavoidable. At present, however, giving greater real autonomy to the SBVN in the

price stability. In these countries, the rate of turnover of the central bank governors is a better proxy for central bank independence.

conduct of monetary policy is very desirable. To a large extent, this depends on how the authorities would tighten the criteria for government financing, and revise the Decree on the SBVN, particularly Article 29 which states that “ the State Bank is to assist the State Budget Office in reaching an agreed total amount of credit the State Bank plans to supply to the Government for the next fiscal year...” and that “the State Bank will negotiate with the Finance Ministry upon amount, length and interest rates of any advance or loss to the Treasury”. Otherwise, up to now, the board of directors of the SBVN has been performing more the role of an advisory committee. Also, given the still close relationship existing between the state-owned banks and the SOEs, it is necessary that the reform of the SOE sector and the banking system should be pursued simultaneously.

Table 21: Ideal Model of Constraints on Central Bank Credit to the Government

| Instrument | Degree of Control | Allowed Maturity | Quantitative Ceiling | Interest Rate |
|--|--------------------------------|------------------|----------------------|----------------------|
| Overdraft on current account | Prohibited | NA | NA | NA |
| Fixed-term loans and advances | Prohibited | NA | NA | NA |
| Purchase of securities (primary market) | Discretionary or Prohibited | NA | NA | NA |
| Purchase of securities (secondary market) | Discretionary | Unconstrained | None | Unconstrained |
| Repurchase agreements (repos) | Discretionary | Unconstrained | None | Unconstrained |
| Gov't deposits at central bank | Discretionary | Unconstrained | Yes ^a | Limited ^b |

Note: a) Expressed as a percentage of government revenue in the preceding year; b) Linked to rate paid on government short-term paper.

Source: Cottarelli (1993, table 2, p.11)

In regard to monetary instruments, in 1996, the SBVN implemented several measures to improve the monetary instruments regarding interest rate policy, refinancing facilities and reserve requirements (IMF 1996). For example, the interest rate on loans

for investment now is higher than that for working capital⁴⁸, and the minimum deposit rate for savings is not differentiated by sector, so that commercial banks can mobilize savings more effectively. Although the refinancing facilities still mainly benefit the SOCBs, the refinancing rate is a penal one to deter banks from freely using that facility for onlending. The 1994-modification in the reserve requirements ratio was reversed; this ratio was again unified at 10 percent, applicable to total deposits. But the more important issue is how Vietnam can effectively use monetary instruments without sacrificing the development of an efficient financial system.

As mentioned in Chapter 3 (Section 3.1.2), direct controls such as limits on interest rates and credit ceilings are rather effective in controlling monetary growth and are easier for the central bank to manage, but could distort resource allocation and hamper the development of the banking sector. At the same time, certain conditions have to be met to fully liberalize interest rates and effectively develop open market operations. Caprio and Levine (1994) suggest that complete deregulation of interest rates should be considered when: macroeconomic conditions are robust enough; the financial position of banks and their borrowers is sound; financial markets are reasonably sophisticated; and financial markets are sufficiently competitive or contestable. In Vietnam, at present, these criteria are barely satisfied or not satisfied at all. The same can be said for developing open market operations to be an effective indirect instrument of monetary policy. The conditions for this are as follows: auctions of government papers are market determined; investors are given a wide choice of

⁴⁸ In Mid-1996, following the low inflation, did the interest rate reduction enable the maximum rate on long-term loans (1.65% per month) to be higher than the short-term rate (1.6% per month) (*Vietnam Investment Review* No 249, 22-28 July 1996). The monthly (6-month) deposit interest rate was also reduced from 1.7% in 1995 to 1.4% in the early 1996, and further to about 1% in mid-1996.

maturities; the central bank's participation should be in both primary and secondary markets (World Bank 1994a: 36). But a secondary market that ensures liquidity in government papers (eg. T-bills) takes time to evolve. Moreover, as Lane (1994) pointed out, until the banking system begins to work efficiently, it will be difficult for other financial intermediaries and a stock market to play a meaningful role in resource allocation and corporate control. And last but not least, the proper use of indirect instruments requires monetary programming skills as well as timely and accurate monetary statistics.

In the foreseeable future, thus, direct monetary instruments will still be important measures in controlling monetary growth. It is worth noting, however, that the view that all direct instruments are regarded as rigid administrative rules, is quite extreme. In fact, market conformity of a monetary instrument to a large extent is the degree to which market forces are relied upon to carry out the influence of the instrument (Hilbers 1993). There may be rigid indirect instruments as well as market-based direct controls (see Table 21).

Therefore, this is the time for Vietnam to develop more market-based direct controls and gradually gain experience with the use of indirect monetary instruments⁴⁹. This option seems to be the second best policy in helping to control money supply and gradually establishing an efficient financial system with full reliance on indirect instruments.

⁴⁹ In the early 1996, the credit ceilings were permitted to be traded among the banks (IMF 1996). However, up to now no trading has taken place.

Table 22: The Degree of Market Conformity of Monetary Instruments

| | <u>Low degree</u> | <u>High degree</u> |
|----------------------|---|--|
| Direct instruments | <ul style="list-style-type: none"> - interest rate regulations - selective credit controls - general credit ceilings | <ul style="list-style-type: none"> - net credit ceilings - tradeable credit ceilings - credit ceilings with the option to exceed the ceiling at a price |
| Indirect instruments | <ul style="list-style-type: none"> - reserve requirements - (preferential) refinance policies on a bank-by-bank basis | <ul style="list-style-type: none"> - open market operations - refinance auctions - foreign currency swaps |

Source: Hilbers (1993).

The choice of monetary aggregates to be targeted depends on which one is the best measure with which to consider the economic impact of change in monetary policy. The econometric evidence from Chapter 5 indicates that either currency in circulation CU or narrow money $M1$ is the most valuable indicator of price pressure and the demand for them has recently been stable and predictable in terms of the relationship between the real money stock and other variables such as real output and opportunity cost reflected in the deviation of the deposit interest rate from the (expected) depreciation rate. Therefore, these monetary aggregates are the preferred targets.

It is worth noting that while CU and $M1$ seem to be easier to control, their usefulness would diminish with the development of new financial instruments and institutions. However, since there is still a lack of reasonable confidence in modelling the demand for real broad money, $M2$, Vietnam needs to have an eclectic approach in using $M2$ as

a monetary target. This has significant implications for the manipulation of domestic credits and the intervention in the foreign exchange market.

6.3. Dynamics of inflation: Lessons and a policy option

This section gives a brief assessment of the dynamics of inflation in Vietnam for the period from the mid-1980s, when the economy experienced very high inflation, to the present time, when rather low inflation has tended to prevail, largely in the light of the theoretical model developed in Chapter 4. Then an option for an appropriate anti-inflation policy will be provided. Since up to now there has existed a 'strong' relationship between the budget, the state-owned banks and the SOEs, it is reasonable to examine the inflationary process referring to the case of a dominant fiscal policy in our model (Chapter 4, Section 4.2.2).

During 1986-88, the annual rate of inflation reached several hundred per cent despite efforts to stabilize the economy. The root cause was that the government failed to deal with the flow problem - the very high public deficits (the budget and the SOE deficits). The monolithic state banking system played only an accommodating role to finance the budget, and the SOE sector continued to face a 'soft budget constraint'. There was also no sign of credibility in the government's reforms (see Chapter 2, especially Section 2.2.2). Anecdotal evidence suggests that the 'black' foreign exchange market at that time was nearly 'rational': it responded very quickly to any measure associated with monetary policy so that the depreciation rate was the leading indicator of actual inflation. Thus, there was a high possibility that the economy was

on the move to the trap of a high and stable inflation equilibrium. In this case, as can be seen in our model (Chapter 4, Section 4.2.2), a mere cut in the monetized public deficit may not have worked in reducing inflation if there was no change in portfolio choice behaviour due to the lack of credibility. The experience of high inflation countries also shows that high inflation is often a prolonged and stable process, and that in this case only decisive efforts can cut inflation down to more or less moderate levels (Bruno 1991).

The reform package in March 1989 was not just a stabilization program, which focused on the control over the flow problem, together with the measures inducing a strong portfolio adjustment in favour of the Dong, such as the increase in interest rates, the unification of the exchange rate and the legalization of gold trading (Chapter 2, Section 2.2.3). In fact, it signalled fundamental changes in the economic system, which in turn changed the people's credibility in the government's policies. As a result, the 1989-reform worked well: the monthly inflation declined even to slightly negative rates in the summer of 1989. The measures affecting the financial portfolio choice by the households continued to be effective even in the context of much higher public deficits. Demand for domestic currency continued to increase strongly and so did the inflation tax base. As a result, the high public deficit could be financed at rather low inflation. In 1989 as a whole, the budget deficit was 7.6% of GDP and domestic credit increased by 175%, but inflation was only 34.7%. Thus, it can be believed that in 1989 the economy was on the move to a low and stable inflation equilibrium.

This situation, however, could not be prolonged as people recognized the reversal of the reforms in 1990-91. During that period, the situation in the SOE sector worsened because of the shocks from the loss of aid in 1990-91 and the collapse of exports with the former bloc of socialist countries in 1991. In order to 'rescue' the SOE sector, the government had to reaccelerate monetary growth. The interest rate policy was relaxed. Also, the growth rate of GDP declined. All these factors led inflation to higher levels, averaging 4.4% per month in 1990-91⁵⁰. The people's confidence in the economic reforms also reversed and in terms of our model, the expectation adjustment could have become faster. The price of gold and foreign exchange increased well ahead of the rate of inflation (World Bank 1992:7, see also Figure 8 in Chapter 3, Section 3.2.2). Thus, the economy could have been in a 'danger zone', where high inflation equilibrium would again become stable because the adjustment parameters could change substantially. Note that the study by Bruno (1989) found that in the case of stabilization in Israel (and maybe in some other Latin American countries), the threshold level of monthly inflation was about 5%, above which the stabilization program could get into serious difficulty.

Fortunately, since 1992, economic reforms have resumed at a rapid pace. A new commitment to keep inflation under control was indeed reflected in policies (see Chapter 3, Section 3.2.2). The government again gradually gained credibility in its policies. At the same time, the surge in the supply of foreign exchange because of foreign investment, growth in exports, and private remittance has also had a significant impact on slowing down the expected depreciation rate and increasing

⁵⁰As the economy stuck to a low stable inflation equilibrium, the increase in the inflation rate can be explained by the factors that shifted the *dd*-curve and 45°-line in Figure 9 (Chapter 4, Section 4.2.2) to the right and left respectively.

demand for the domestic currency. As a result, the SBVN could progressively lower the deposit interest rates (see Figure 7, Chapter 2, Section 2.2.3), without losing the attractiveness of the Dong. As shown in Chapter 5 (Section 5.2), the economy shifted to a relatively low and stable inflation equilibrium, although the condition for stability of this equilibrium has just been satisfied since the end of 1993 and not firmly established. Now the message from our theoretical model and the econometric investigation for the option of an appropriate anti-inflation policy is clear:

- To keep inflation under control, it is necessary to avoid the policy 'shocks' that could destroy the existing slow expectation adjustment, which is not well entrenched. The shocks may happen, for example, because of a weak commitment to price stability through an increase in inflationary target, or a sudden large devaluation, or the slowing down of the pace of the fiscal and SOE reforms.
- To sustain lower inflation rates, it seems best to provide the SBVN with greater autonomy in formulating and implementing monetary policies. Then the SBVN can choose the path for money growth corresponding to a particular inflationary target. Given the fact that the SBVN still plays a rather passive role in the interplay between fiscal and monetary policies, it is necessary in this case to keep the public deficit adjustments in line with the seigniorage revenue corresponding to a new lower inflationary target. Then, other policies such as interest rate and exchange rate policies, which do not allow the Dong to lose its attractiveness, can play a supporting role in this process.

At present, however, Vietnam is facing several challenges in implementing a more stringent fiscal policy. The first question is whether Vietnam can keep the primary budget deficit at an appropriate percentage of GDP even if it could be financed by domestic and foreign borrowings. Otherwise the total budget deficit will keep growing as the debt grows because of the deficit, and interest payments will rise because the debt is growing. Debt-financed persistent deficits may create a substantial burden in the future; then the government may be forced to finance the large deficit again through seigniorage. Moreover, domestic borrowings will crowd out private investment. This could be a serious problem if there were inefficiencies in budget expenditure.

The next question is whether Vietnam can reveal clearly its 'quasi-fiscal' deficit. Because the budget deficit is only a part of the story, all 'quasi-fiscal' activities such as bad debts of the SOCBs, interenterprise arrears, losses on foreign exchange operations, government guarantees for loans to some SOEs, should be part of the accounting. Without the inclusion of the 'quasi-fiscal' losses, the government cannot see the total public deficit that truly does matter for the issue of the control of monetary emission. In that sense, an audit of the state-owned banks (the SBVN and SOCBs) is worth encouraging.

The last but not least question in dealing with the public deficit is the process of the reform of the SOE sector. The result of the econometric estimations (Chapter 5, Section 5.1.2) indicates a lack of any long-lasting effect of industrial output growth on inflation. This may reflect a better management of the SOE sector, whose growth in industrial output is not brought about solely by growth in bank credit as in the past. At

the same time, the existence of the short-duration effect from the industrial expansion suggests that a harder budget constraint policy should be sustained. At present, the sustainability of such a policy is threatened by several factors: the tendency to return to subsidizing the SOEs; the still rather high level of seigniorage⁵¹; the formation of SOE conglomerates, which will dominate the industrial sector, but hardly operate efficiently and competitively, as hoped by the Vietnamese government.

As also shown by the econometric estimations in Chapter 5 (Section 5.1.2), the rate of return on the Dong in terms of US dollars, which is measured as the difference between deposit interest rate and (expected) depreciation rate, has a significant impact on the inflation rate. Mathematically, an increase in the deposit interest rate or the same percentage points decrease in the (expected) depreciation rate, other things being equal, has the same impact in percentage terms on lowering the inflation rate. From the view point of policies aimed at promoting the Dong, however, the changes in these variables are subject to different constraints.

It is often said that a high deposit interest rate policy has been an effective tool to aid the disinflation process in Vietnam. In fact, the Vietnamese experience shows that an active interest rate policy in defending domestic money works not necessarily because of high interest rate, but mostly because in combination with the tightened fiscal and monetary policies and the establishment of people's credibility in the government efforts to fight against inflation. High deposit interest rates also imply higher loan interest rates and hence, can be very costly for the economy and can not be sustained.

⁵¹Dornbusch and Fischer (1993) found that seigniorage revenue accounted for a significant share of government revenue in most of the moderate-inflation countries. It is likely that seigniorage is rarely an explicit reason for a government to pursue inflationary policies.

One should, thus, be aware of the limitations of the high interest rate policy, although the policy for positive interest rates in real terms is in the right direction. One question arises: How can the SBVN determine the appropriate interest rate level(s)? The answer to this question is not simple, but a number of indicators can be used. The indicators are: positive level in real terms; positive rate of return on the Dong in terms of US dollars circulating in the economy; rates of return on investment; relative price of capital and labour; and interest rates in the informal sector as the upper bound (see also Leite and Sudararajan 1990).

On the other hand, it is difficult to sustain a stable nominal exchange rate in the context of moderate inflation. Over time, this may have a very considerable negative impact on economic growth (see Chapter 5, Section 5.2.2). Moreover, as predicted by our theoretical model, the economy has been moving to a relatively low and stable inflation equilibrium from below because for a rather long time the (expected) depreciation rate has been lower than the inflation rate⁵². Thus, other things being equal, there is a tendency for both the inflation and depreciation rate to increase somewhat. Two important things are implied from this analysis. First, this confirms again the decisive role of the public deficit adjustments in the policy package in line with a lower inflation rate. Second, if there is some pressure in the market on depreciation, the SBVN should allow this to occur, intervening only to smooth out the depreciation movement, without the fear of falling into a 'vicious circle' in the relationship between the depreciation rate and the inflation rate. The very high rate of return on Dong in real terms and in terms of US dollars in recent years (Table 10,

⁵²See detail of the explanation in Chapter 4 (Section 4.2.2). Here we just mention that as equilibrium point A in Figure 9 is stable, there are only two possibilities: if $\varepsilon' > \pi$, then the economy is moving to A along the dd -curve from above; if $\varepsilon' < \pi$, then the economy is moving to A from below.

Chapter 3, Section 3.2.2) also indicates that there is a little room for depreciating the exchange rate (/or reducing deposit interest rate) without causing a significant shift out of Dong to US dollars. But the SBVN needs to prevent the 'jump' in the rate of depreciation and to avoid a sudden large devaluation. Otherwise, these kinds of 'shocks' can weaken and destroy the people's credibility in the government's anti-inflation policy.

Summary

This chapter attempts to provide a general framework for anti-inflation policy. It is desirable for Vietnam to pursue a target of low rather than moderate inflation rates. In order to achieve this target, in general, the policy package recommended is quite 'traditional'. A firm commitment to sustain low inflation should be the starting point for policy formulation. The SBVN in a more deregulated financial environment needs autonomy and relative policy independence. In this direction, now is the time for the SBVN to develop and implement more market-based direct control over money supply and step-by-step gain experience with the use of indirect instruments. Also, at least in the near future, currency in circulation and narrow money rather than broader money are better monetary aggregates to be targeted.

Since the SBVN can still be forced to provide direct credit to the government, dealing with public finance will play a decisive role in keeping and sustaining low inflation. In this regard, it is important not to allow the budget deficit to rise out of control, to specify all 'quasi-fiscal' losses, and to sustain a harder budget constraint policy to the SOE sector. Better management of public finance also creates a good precondition for

the successful implementation of other supporting policies, such as exchange rate policy and interest rate policy, in combating inflation. For example, a depreciation of the Dong and/or a choice of the (deposit) interest rates then could be made more reasonably, without the fear of creating high costs to economic activities, while the Dong remains attractive.

Chapter 7

Conclusion

The purpose of this thesis is to study the process of inflation stabilization in Vietnam, focusing on the 'price-salary-money reform' in 1985, the stabilization policy package in 1989, and the market-oriented reforms since then.

The outcomes of Vietnam's efforts to stabilize the economy in 1985 and 1989 are mostly explained within the framework of a theory of the financial system in a CPE. Under a CPE or MPE, the monolithic state banking system acts as the interface between the state budgetary process and SOEs, ensuring the flow of financial resources in accordance with the national plan. With the passive role of the banking system and the 'soft budget constraint' facing the SOE sector and in an environment of controlled prices and rationing, the economy is prone to the increasing inflationary pressure that comes from two sources- the central bank credits extended to cover the government budget deficit and the deficits of the state-owned enterprise sector (the 'flow' problem), and the excess money stock over the desired level (the so-called 'monetary overhang' or the 'stock' problem). However, this thesis argues that, in the case of Vietnam, there was no significant 'monetary overhang' in the period before the 1989-reform. The main reason was the strengthening of the parallel economy and the increase in voluntary interaction between economic agents through the free market channels partly resulting from microeconomic reforms introduced in the early 1980s. This should, thus, have given encouragement to efforts to liberalize prices, and the

main task should have been to control credit expansion. Unfortunately, this was not the story of the 1985-reform. While the government applied unnecessary measures of confiscatory monetary reform to deal with the insignificant stock problem, the flow problem became even more serious. The much greater focus on the flow problem in the 1989-reform made a decisive contribution to reduce inflation sharply, at least in the first half of 1989. Also, the legalization of many economic activities in the parallel market, in addition to the decisive stabilization package, strengthened the credibility of the government policies. As a result, the financial portfolio choice by the population in favour of the domestic currency was enhanced. This was a very important factor in explaining the success of inflation stabilization in 1989 as a whole.

As the problem of inflation stabilization became more diffuse, the thesis attempted to cover a wider range of factors that could be important for understanding the inflationary movement in Vietnam since the 1989-reform: from the financial reform and the ability to control money supply by the central bank, to the underlying determinants of inflation, the dynamics of inflation and the conditions for stability of inflation.

The most remarkable progress in the reform of the financial sector in the first half of the 1990s was the establishment of the two-tier banking system and the abolition of the barriers to entry for new domestic and foreign banks. The SBVN also implemented a more active interest rate policy and used more effectively the credit ceiling measure to restrain money expansion. The financial environment remains, however, typical of an 'underbanked' country: the limited degree of independence in conducting monetary policy by the SBVN; the dominant role of the SOCBs biased

against the non-state sector; the limited role of markets for domestic securities; the existence of a significant informal financial sector; and a lack of the necessary public confidence in the banking system. The consequences of this financial system are that public finance still plays a very important role in money supply and the money supply may be expanded without rigorous control. Also, the underdevelopment of the financial sector has constrained the efficient use of the market-based monetary instruments.

The thesis also investigated the major determinants of the inflation rate in Vietnam since the market-oriented reforms in 1989. The investigation relied on the monetarist as well as structuralist approaches to the causes of inflation. A simple model was specified, which explains inflation as a result of the changes in money supply and the factors determining the demand for real balances. Both the intuition behind the descriptive statistics and the econometric analysis confirm the key role of money growth and especially, the factors reflecting the attractiveness of the Dong such as the (expected) depreciation rate and the deposit interest rate, in affecting the inflation rate. Thus, the root causes of the success in bringing inflation under control were the fiscal restraint and harder budget constraint of the SOEs, which formed the foundation of a sounder monetary policy, and the large portfolio choice in favour of the Dong. At the same time, a harder budget constraint policy should be sustained. At present, the sustainability of such a policy is threatened by several factors: the tendency to return to subsidizing the SOEs; the still rather high level of seigniorage; the formation of SOE conglomerates, which dominate the industrial sector, but hardly operate efficiently and competitively, as hoped. Also, the econometric investigation suggests

that currency in circulation CU and narrow money $M1$ contain more useful predictive information of inflation than broader money $M2$.

In order to examine the dynamics of inflation and the condition for stability of inflation, a simple dynamic model was developed. The model reflects the features having the most important impact on inflation in Vietnam: public finance through seigniorage, the demand for domestic money in the context of the existence of a significant parallel foreign exchange market and high economic growth, and the dynamic behaviour of the expected exchange rate. The main idea for building the model is the Laffer curve of inflation tax revenue: the same amount of seigniorage revenue can be attained at low or high inflation. As a result, the economy can run to hyperinflation, stick in the 'high inflation trap', or stay at a low stable inflation equilibrium, depending on its initial position, the size of the monetized public deficit, and the speed of expectation adjustment. The model also strengthens the argument in favour of central bank independence in fighting inflation.

The model seems to explain quite well the dynamics of inflation in Vietnam since the mid-1980s, particularly in terms of the changes in people's confidence in and expectation of government policies. Once again, it was established that a belief on the part of the Vietnamese people in fundamental policy changes and commitment to stabilize the economy in 1989 enabled the government to ease money supply without re-igniting inflation. But the government could not use this kind of credibility for long as people recognized the reversal of the reform in 1990-91. Since 1992, together with a new commitment to keep inflation under control and better macroeconomic management in the continuing process of reform, the government has gradually re-

gained the people's confidence. In fact, the econometric investigation shows that the condition for inflation stability has been met since the end of 1993, and hence, relatively low inflation in recent years has tended to be stable. However, the process towards financial stability has been not firmly established. Furthermore, we also found that a long run relationship of the real demand for *CU* and *M1* has started to emerge.

What anti-inflation policy package should be adopted by the Vietnamese government? First, the thesis argues that it is desirable to pursue a target of single-digit inflation rates. Second, the SBVN should really become more independent in conducting monetary policy and the second best policy for the SBVN now is to implement more market-based direct control over money supply, while gradually gaining experience with the use of indirect monetary instruments. Also, at present, *CU* and *M1* rather than *M2* are better monetary aggregates to be targeted. Third, the policy package should keep up the existing condition for stability of inflation and moreover, correspond to a lower inflation equilibrium. In that sense, a firm commitment to price stability and a more rigorous adjustment of public finance are essential elements in the policy package. This will also create an easier condition for pursuing more reasonable policies in regard to the exchange rate and the interest rate; that is policies to reduce the costs of economic activities, while keeping the attractiveness of the Dong.

The year of 1996 could be a good example for illustrating this anti-inflation policy package. This was the second time that the inflation rate in Vietnam was reduced to a single-digit level (4.5%), while the economy continued to grow as fast as in 1995 (9.5%). What we can observe is a non-monetized budget deficit and rigorous constraint in credit expansion, particularly to the SOE sector. The SBVN could reduce

considerably both deposit and loan interest rates (see Chapter 6, Section 6.2). At the same time, the nominal exchange rate (Dong vs US dollar) only slightly depreciated by about 0.5% despite widespread speculation over a devaluation of the Dong because of a substantial increase in the trade deficit.

In general, Vietnam now has several good conditions for pursuing a low inflation target. Vietnam has recognized the importance of inflation stabilization and has learnt valuable lessons in dealing with the inflation problem. In the medium term, capital inflow seems to be continuing and this would have a positive contribution to the fiscal (public deficit) management and the portfolio choice in favour of the Dong. Another very favourable condition is the fact that at present, the economy is close to a low, stable inflation equilibrium. The theoretical model shows that, in this case, the economy can benefit from overall high economic growth and the strategy for keeping/lowering the inflation rate is quite clear since the effects of the policy changes are 'traditional'.

At the same time, the most serious challenge to Vietnam is how far the reforms of the financial system and the SOE sector can go. To a large extent, the answer to the question of how long Vietnam can keep up the spectacular achievement in controlling inflation and promoting growth depends on the process of the simultaneous reforms of these sectors. On the one hand, Vietnam has accepted the necessity of a market economy and recognized that the economy cannot function efficiently without a healthy financial environment and decisive reform of the SOE sector. On the other hand, Vietnam seems still to prefer a economy, in which the state sector should play a 'leading role'. If the latter can be interpreted to mean the state setting the framework

Appendix

A. The estimation of demand for money

A.1. General framework

Over the past ten years the error-correction models (ECMs) have been widely used in estimation of the demand for money. The ECMs have several advantages. These models not only capture the long-run relationship but also reflect the short-run behaviour of money demand. The latter is important since theory provides little guide to the short-run dynamics of money demand. The general ECMs allow also for a much broader range of dynamic behaviour than the partial adjustment model (PAM), that is only the simplest case as will be seen below. Moreover, the ECMs help to avoid the spurious regression problems that can arise in estimating models with nonstationary variables.

There are two common approaches in the use of the ECMs. The first approach is associated with the 'purely statistical' concept of cointegration and practically is implemented by the following procedure (Engle and Granger 1987). First, it is important to verify the orders of integration for each of the variables under consideration with the help of the unit root tests, a standard test of which is the Augmented Dickey-Fuller (ADF) test. Second, if the nonstationary variables are integrated of the same order (usually order one), then the long-run relationship between the concerned variables (their cointegration) can be confirmed by testing the

residuals from cointegration (OLS) regression for stationarity. In the case of the existence of cointegration, the short-run dynamics can be represented by the ECM, which involves regressing the first difference of the dependent variable in the cointegration regression onto lagged values of the first differences of all of the variables plus the lagged value of the error-correction term, ie the just mentioned residuals (see also Equation A.2 below for comparison).

The second regards ECMs as a structural representation of dynamic adjustment towards equilibrium based on decision rules. For example, the ECMs can be derived from a forward looking quadratic costs of adjustment optimization problem (Nickell 1985 and Vo 1993). Suppose that the natural logarithm of desired real money stock, $\log m^*$, is given by

$$\log m_t^* = \alpha_0 + \alpha_1 \log y_t + \alpha_2 z_t + u_t \quad (\text{A.1})$$

where $\log y$ is the natural logarithm of a scale variable, z is an opportunity cost variable (or vector), and u is error term. Then the money demand function derived from the adjustment problem can be written as

$$\Delta \log m_t = \beta_0 + \sum_{i=0}^n (\beta_1 \Delta \log y_{t-i} + \beta_2 \Delta z_{t-i} + \beta_3 \Delta \log m_{t-i}) + \beta_4 (\alpha_1 \log y_{t-1} + \alpha_2 z_{t-1} - \log m_{t-1}) + v_t \quad (\text{A.2})$$

where $\log m$ is the natural logarithm of actual real money balances. β_1, β_2 determine the impact effects, while the long-run effects can be ascertained by α_1 and α_2 . The coefficient β_4 represents deviations from long-run equilibrium and gives the error

correcting properties: if real money balance is below that consistent with desired long-run holding, real money demand increases. Note that the appearance of the lagged terms of $\Delta \log y$, Δz , and $\Delta \log m$ on the right hand side depends on the behaviour of the target values, $\log m^*$. Also, the test for cointegration is essential for ensuring the non-existence of the spurious regression problem.

One special, but common case is the *standard* ECM that has the following form:

$$\Delta \log m_t = \beta_0 + \beta_1 \Delta \log y_t + \beta_2 \Delta z_t + \beta_4 (\alpha_1 \log y_{t-1} + \alpha_2 z_{t-1} - \log m_{t-1}) + v_t \quad (\text{A.3})$$

Then the PAM is nothing but the standard ECM with the restriction $\beta_4 \alpha_1 - \beta_1 = \beta_4 \alpha_2 - \beta_2 = 0$. The PAM can be also easily derived directly from the assumption that the actual change is only a fraction of desired change in real money stock, i.e. $\Delta \log m_t = \gamma (\log m_t^* - \log m_{t-1})$ ($0 < \gamma < 1$) or $\log m_t^* = (1 - (1 - \gamma)L) \log m_t$, where L is a lag operator (e.g. $L(\log m_t) = \log m_{t-1}$). Substituting the last into (A.1) will give the PAM

$$\log m_t = \alpha_0 \gamma + \alpha_1 \gamma \log y_t + \alpha_2 \gamma z_t + (1 - \gamma) \log m_{t-1} + \gamma u_t \quad (\text{A.4})$$

Of course, the best is to estimate more general ECMs (with a cointegration test). But this requires a rather large sample of time-series data (usually quarterly or monthly). In many former CPEs, this kind of data is commonly not available for the period before market reform. To deal with annual data over a not very long period, the PAM seems to be acceptable as the first attempt in the estimation of demand for money (see Portes and Winter 1978, and Feltenstein and Farhadian 1987), although PAM is simple and

usually gives a very low speed of adjustment. In order to apply the general ECMs some authors like Burton and Ha (1990) have constructed many quarterly data from the annual series based on very specific assumptions. The results, as they mentioned, 'may reflect to some extent, the idiosyncrasies of the data'.

A.2. Demand for money in Vietnam during the 1980s

In dealing with the data, Vietnam in the 1970s and 1980s is no exception. The reunification of the country took place only in 1976 after the war. For many economic variables we can obtain, at best, the annual time-series since 1977. There is a need also to adjust some monetary variables since the monetary reform was implemented in 1985. The quality of statistical figures is another serious problem (see for example Fforde and Vylder 1988, Kimura 1989). For these reasons, the estimation can be only a preliminary attempt at the analysis of money demand behaviour in Vietnam when it was mainly a MPE.

The PAM (Equation A.4) is estimated for three monetary aggregates: household deposits HD , currency in circulation CU , and narrow money, also denoted as $M1$, but defined here as $HD + CU$. Note that in CPEs, there is a distinction between two money circuits, so it would be incorrect to estimate a money demand when the money supply series contains both enterprise deposits as well as the population's cash holding. The *real* national income indexes are chosen as a proxy for the scale variable due to the lack of data of household incomes. Given the fact that interest rates are not market determined and the period under consideration was characterized by high inflation, the

inflation is a quite acceptable variable used for measuring the opportunity cost of holding money. And there exist two alternative measures. The conventional way is inflation rate π . But recently, it is argued that in the case of high inflation associated with the revenue through seigniorage, a kind of the variation in inflation rates measured as $\pi/(1+\pi)$, is a better choice (Calvo and Leiderman 1992, and Easterly *et al* 1995). The sources of data for all variables are those indicated in Figures 1 (for national income), 4 (for currency in circulation) and 5 (for prices) (Chapter 1, Sections 1.1 and Chapter 2, Section 2.2.1) and in Table 5 (for household deposits) (Chapter 2, Section 2.2.1).

Table A.1 presents the results of the OLS estimation in two variants for three *real* monetary aggregates that are measured as the natural logarithm of *HD*, *CU*, and *MI* deflated by free market price indexes (they are denoted as *loghd*, *logcu*, and *logmi*, respectively). Variant (a) uses π , which is measured as the change in free market price indexes, but variant (b) uses $\tilde{\pi} = \pi/(1+\pi)$ as an appropriate opportunity cost of holding money. In both variants, *logni* is natural logarithm of real national income indexes. The figures in parentheses are t-ratios.

Table A.1: The PAMs of Demand for Money

| Model | I (loghd) | | II (logcu) | | III (log ml) | |
|--|----------------------|-----------------------|------------------------|------------------------|-----------------------|-----------------------|
| Sample | 1978 - 91 | | 1977 - 91 | | 1978 - 91 | |
| Variant | (a) | (b) | (a) | (b) | (a) | (b) |
| Constant | -12.407 (-2.87)** | -14.427 (-3.82)*** | -12.692 (-3.65)*** | -13.674 (-4.19)*** | -12.979 (-3.35)*** | -14.377 (-4.17)*** |
| logni | 2.174 (2.682)** | 2.644 (3.648)*** | 2.161 (3.622)*** | 2.391 (4.181)*** | 2.281 (3.313)*** | 2.603 (4.170)*** |
| π for(a) and $\tilde{\pi}$ for (b) | -0.160 (-1.820) | -1.841 (-2.895)** | -0.052 (-1.115) | -0.663 (-1.821)* | -0.080 (-1.551) | -0.966 (-2.490)** |
| Lagged dependent variable | 0.555 (2.738)** | 0.476 (2.731)** | 0.380 (1.885)* | 0.351 (1.899)* | 0.399 (1.885)* | 0.348 (1.874)* |
| R-bar-squared | 0.684 | 0.776 | 0.806 | 0.836 | 0.780 | 0.835 |
| Overall F-test | F(3,9) = 9.644*** | F(3,9) = 14.850*** | F(3,10) = 19.008*** | F(3,10) = 23.127*** | F(3,9) = 15.199*** | F(3,9) = 21.251*** |
| S.E. of regression | 0.429 | 0.361 | 0.255 | 0.234 | 0.283 | 0.245 |
| <u>Diagnostic tests:</u> | | | | | | |
| Autocorrelation $\chi^2(1)$ | 0.351 | 2.537 | 0.474 | 0.035 | 0.127 | 0.077 |
| Functional form $\chi^2(1)$ | 2.915* | 0.503 | 0.074 | 0.682 | 0.071 | 0.008 |
| Normality $\chi^2(2)$ | 2.767 | 0.006 | 0.051 | 0.071 | 0.114 | 0.975 |
| Heteroscedasticity $\chi^2(1)$ | 0.549 | 0.758 | 0.55E-3 | 0.070 | 0.105 | 0.006 |
| CUSUM-SQ test | pass | pass | pass | pass | pass | pass |

Note: *, **, *** always mean significance at 10%, 5% and 1% levels respectively. SE of regression is the standard error of the regression. The estimation using the general price indexes gives no significant changes (The correlation between the inflation rates of general prices and free market prices is 0.99 during 1976-88. Since the 1989-reform, there has been only one price index, the market price index).

Here the diagnostic tests consist of four tests. The test for serial correlation is the Lagrange multiplier (LM) test, which is conducted by regressing the residuals on their lags (here only one lag is used) and the explanatory variables from the model. the critical values are drawn from the χ^2 -distribution. The functional form test (Ramsay's Reset test) is a general misspecification test and is performed by adding the powers of fitted value of the dependent variable as additional regressors to the equation and testing whether coefficients of the powers are jointly zero. In our case, this test uses only the square of the fitted values. The test for normality of the error term (Jarque-Bera test) is distributed χ^2 with 2 degree of freedom under the H_0 -hypothesis of normality (in fact, Jarque-Bera test is only the test for skewness and kurtosis of residuals). The test for heteroscedasticity is White test, which is based on the regression of squared residuals on squared fitted values. The critical value is also drawn from the χ^2 -distribution.

In all models, the signs of independent variables are right and in general, demand for real balances very significantly depends on the real income. The highly significant overall F-test indicates that the explanatory variables as a group, explain well the demand for real balances. However, the opportunity cost measured as $\tilde{\pi}$ in the models of variant (b) only is significant. Also, for each model, the variant (b) has higher explanatory power (R -bar-squared) and smaller standard error of regression. There are no problems in diagnostic tests for most models, except for the Model I(a), for which the functional form test failed. Given also the small number of observations the cointegration test cannot be implemented. The test for structural stability is based on the cumulative sum of the recursive residuals squared (Cusum-sq) statistic. For all

models, the hypothesis of stability cannot be rejected, but the 95 per cent confidence interval is nearly broken at 1986 - the first year of price-salary-money reform and at 1989 - the year with the substantial increase in household deposits in the cases of Model II and Model I, respectively. But when both currency in circulation and household deposits are taken into account (the case of Model III), demand for real balances is fairly stable.

Thus, the Models I(b), II(b), and III(b) are more suitable for describing the demand for money in Vietnam by the end of the 1970s and during the 1980s.

It is worth noting that in all models the speeds of adjustment measured as mean lag, $(1-\gamma)/\gamma$, are not low, as usually expected with the use of PAM (Table A.2). However, they have very high income elasticities that although not unusual (see, for example, Feltenstein and Farhadian 1987, and Portes and Winter 1978) are not sustainable in the very long run. With the annual data and small number of observations, the long-run income elasticities seem to be meaningless, so they are not presented here.

Table A.2: Speeds of Adjustment and Income Elasticities

| Model | I (loghd) | | II (logcu) | | III (logmI) | |
|-------------------------------|-----------|------|------------|------|-------------|------|
| Variant | (a) | (b) | (a) | (b) | (a) | (b) |
| Speed of adjustment | 1.25 | 0.91 | 0.61 | 0.54 | 0.66 | 0.53 |
| (Short-run) Income elasticity | 2.17 | 2.64 | 2.16 | 2.39 | 2.28 | 2.60 |

B. Unit root tests and stationarity of the time series

In the estimation of demand for money in the first half of the 1990s (Chapter 5, Section 5.2.1), the unit root tests are essential to verify whether the nonstationary variables are integrated of the same order, so that there exists any long run demand for real balances. The former situation is related to the all series involved in the estimation of demand for money: $\log m$ ($\log cu$, $\log m1$, $\log m2$), $\log y$, $\varpi = \varepsilon - i_d$, and π , where m (cu , $m1$, $m2$) is real money, ie. nominal money M (CU , $M1$, $M2$) deflated by CPI, y is real income proxied by real industrial output, ε is depreciation rate and i_d time deposit interest rate, and π is inflation rate calculated from the CPI. In the latter situation, the question is whether the residuals from cointegration regressions are stationary. The estimation of the distributed-lag model in Chapter 5 (Section 5.1.1) also requires the unit root tests for the time series gM (gCU , $gM1$, $gM2$), gy , ϖ and π , where gx means growth rate of variable x .

The unit root tests are performed using Augmented Dickey-Fuller (ADF) test. In order to implement ADF test for a series x_t , the following regression is estimated via OLS method:

$$\Delta x_t = c_0 + [b_0 T] + b_1 x_{t-1} + \sum_{i=1}^s c_i \Delta x_{t-i} + \mu_t \quad (\text{B.1})$$

where T is time-trend and s should be chosen to induce the error term μ_t into white noise. Note that Dickey-Fuller test (DF tests) can be regarded as a special case of the ADF test with $s = 0$ (no lags of Δx_t in the RHS of Equation B.1). The null hypothesis

in the ADF test is the existence of a unit root ($b_1=0$). The series x_t is stationary or integrated of order zero ($x_t \in I(0)$), ie the null hypothesis is rejected, when the statistic for b_1 (ADF statistic, calculated as the t-statistic) is significantly negative in comparison with the Dickey-Fuller critical value. If $x_t \notin I(0)$, but $\Delta x_t \in I(0)$, then x_t is said to be cointegrated of order one ($x_t \in I(1)$).

Table B.1 presents the results of the ADF tests (without a time trend) for $\log cu$, $\log m1$, $\log m2$, $\log y$, ϖ , and π . The values of ADF statistics are shown corresponding to the shortest lag lengths s for which the hypothesis of no autocorrelation up to 12 lags can not be rejected at the 5 per cent significance level (Note that the same kind of ADF statistics will be shown for the other cases). It is apparent that both ϖ and π belong to $I(0)$, whilst $\log cu$, $\log m1$, $\log m2$, and $\log y$ all belong to $I(1)$. Thus, the cointegration regressions can be run for the variables under consideration.

Table B.1: ADF Tests for $\log cu$, $\log m1$, $\log m2$, $\log y$, ϖ , and π
(Sample period: 1990:12 - 1994:12)

| x_t | $\log cu$ | $\log m1$ | $\log m2$ | $\log y$ | $\varpi = \varepsilon - i_d$ | π |
|---------------|------------------|------------------|------------------|-----------------|------------------------------|-----------|
| ADF statistic | -0.386 | -0.741 | -0.528 | -1.408 | -3.988*** | -5.686*** |
| Δx_t | $\Delta \log cu$ | $\Delta \log m1$ | $\Delta \log m2$ | $\Delta \log y$ | | |
| ADF statistic | -3.129** | -4.188*** | -4.705*** | -4.770*** | | |

Note: The approximate Dickey-Fuller critical value at 5 (1) per cent significance level is about -2.93(-3.58). For $\log cu$, $\log m1$, $\log m2$ and $\log y$, in fact, all ADF statistics for b_1 from $s=0$ to $s=12$ are not significant. The results of the ADF-tests with time trend are the same in terms of acceptance/rejection of the null hypothesis of a unit root.

The results of the ADF tests for the residuals from cointegration regressions are presented in Table B.2. A difference here is that the ADF tests are undertaken without constant term and time trend (see Maddala 1992: 607). We denote *rescu*, *resm1*, *resm2* the corresponding residuals from the cointegration regressions using *logcu*, *logm1*, and *logm2* as dependent variables, respectively. The figures in brackets are DF critical values for acceptance/rejection at 5 per cent significance level. Clearly, *rescu* $\in I(0)$ over 1992:10 - 1994:12, so the long run demand for real currency in circulation exists. There is also evidence, although weak, in favour of the stationarity of *resm1* over 1992:10 - 1994:12 and, hence, the existence of the long run demand for real narrow money.

Table B.2: ADF Tests for *rescu*, *resm1*, and *resm2*

| Sample period | <i>rescu</i> | | <i>resm1</i> | | <i>resm2</i> |
|-----------------|--------------|----------|--------------|----------|-----------------|
| 1990:12-1994:12 | -2.694 | (-3.923) | -2.770 | (-3.923) | -2.340 (-3.927) |
| 1990:12-1992:9 | -2.014 | (-4.171) | -2.311 | (-4.171) | -2.195 (-4.194) |
| 1992:10-1994:12 | -4.384** | (-4.114) | -4.056* | (-4.098) | -3.224 (-4.098) |

Note: In fact, over the samples 90:12-94:12 and 90:12-92:9, the ADF tests are in favour of nonstationarity of residuals since all ADF statistics are not significant.

Now we show the results of the ADF tests for the series *gM* (*gCU*, *gM1*, *gM2*), *gy*, ϖ , and π . Since the results for the series π and ϖ are already known (they $\in I(0)$), Table B.3 presents only the results of the tests for the series *gCU*, *gM1*, *gM2*, and *gy*.

Table B.3: ADF tests for gCU , $gM1$, $gM2$, and gy .

(sample period 1990:12 - 1994:12)

| $x_t =$ | gCU | $gM1$ | $gM2$ | gy |
|---------------------|-----------|-----------|-----------|-----------|
| Statistic for b_1 | -5.374*** | -5.494*** | -4.662*** | -4.602*** |

Note: The approximate Dickey-Fuller critical value at 5 (1) per cent significance level is -2.93 (-3.58). The results for the ADF-tests with time trend are the same in terms of rejection of the null hypothesis of a unit root.

As the null hypothesis of a unit root is rejected at the 1 percent level, all these variables are stationary. The results are quite expected since $gy \approx \Delta \log y$, and if the prices change not much, $gM \approx \Delta \log M = \log(M/M(-1)) = \log((M/P(-1))/(M(-1)/P(-1))) \approx \log m - \log m(-1) = \Delta \log m$, and we know that all $\Delta \log m$ and $\Delta \log y$ belong to $I(0)$.

C. The procedure for identifying the appropriate lag length of each determinant in a distributed-lag model

This procedure is based on Akaike's minimum final prediction error (FPE), which is calculated as $FPE = (RSS/T) * ((T+k+1)/(T-k-1))$, where RSS is the regression residual sum of squared, T is number of observations, and k is number of the explanatory variables. The procedure is written here in the more formal manner than in Hsiao (1981).

Suppose V consists of the determinants of inflation in Model (35) (Chapter 5, Section 5.1.1): $V = \{gM(gCU, gM1, gM2), gy, \pi^e, \varpi\}$.

Step 1: Consider *all* FPEs for the following set of regressions: $\{\pi_t = \alpha_0 + \alpha_1(L)x_t \mid x_t \in V \text{ and } \alpha_1(L) \text{ is polynomial in lag operator } L \text{ with the lags varying from 0 to the highest order of } n_v\}$.

Step 2: $x^1 \in V$ and the corresponding lag length n_1 are chosen if they correspond to minimum FPE from *all* FPEs in Step 1. This minimum FPE now is denoted by $\text{FPE}(x^1, n_1)$. $\text{FPE}(x^1, n_1)$, thus, also is minimum from the minimum FPEs for the regressions corresponding to each x_t .

Step 3: Consider all FPEs for $\{\pi_t = \alpha_0 + \alpha_1(L)x^1_t + \alpha_2(L)x_t \mid x_t \in V \setminus x^1, \alpha_1(L)x^1_t \text{ is fixed as the choice in Step 2, and } \alpha_2(L) \text{ is polynomial in } L \text{ with the lags varying from 0 to } n^1\}$.

Step 4: Again $x^2 \in V \setminus x^1$ and the corresponding lag length n_2 are chosen if they minimize the FPE and $\text{FPE}(x^2, n_2) < \text{FPE}(x^1, n_1)$.

Repeat the same procedure until all elements of V are examined. As in Step 4, if the addition of any of remaining elements of V results in an increase in the FPE value, the procedure stops, and the model is limited to the case of the previous step.

Table C.1: The minimum FPEs and the choice of the appropriate lag lengths

| | | | | | | |
|---|---------------------------|--------------------------------------|---------------------------|--------------------------------------|--------------------------------------|---|
| <i>Polynomial Model 1:</i> $\pi_t = \alpha_0 + \alpha_1(L)x_t \quad x_t \in V$ | | | | | | |
| | <u>gCU</u> | <u>gM1</u> | <u>gM2</u> | <u>gy</u> | <u>$\pi^f = \pi_{-1}$</u> | <u>$\overline{\omega}$</u> |
| FPE _{min} | 0.0289 | 0.0276 | 0.0219 | 0.0309 | 0.0207 | 0.0167 |
| Corresponding lag | 2 | 2 | 5 | 2 | 4 | $n_{\overline{\omega}}=6$ |
| <i>Polynomial Model 2:</i> $\pi_t = \alpha_0 + \alpha_1(L, n_{\overline{\omega}})\overline{\omega}_t + \alpha_2(L)x_t \quad x_t \in V \setminus \overline{\omega}$ | | | | | | |
| | <u>gCU</u> | <u>gM1</u> | <u>gM2</u> | <u>gy</u> | <u>$\pi^f = \pi_{-1}$</u> | |
| FPE _{min} | 0.0135 | 0.0139 | 0.0149 | 0.0158 | 0.0159 | |
| Corresponding lag | $n_M=1$ | $n_M=2$ | $n_M=3$ | 3 | 1 | |
| <i>Polynomial Models 3:</i> $\pi_t = \alpha_0 + \alpha_1(L, n_{\overline{\omega}})\overline{\omega}_t + \alpha_2(L, n_M)gM_t + \alpha_3(L)x_t \quad x_t \in V(\overline{\omega}, gM)$ | | | | | | |
| | | <u>gy</u> | | <u>$\pi^f = \pi_{-1}$</u> | | |
| Case | <u>CU</u> | <u>M1</u> | <u>M2</u> | <u>CU</u> | <u>M1</u> | <u>M2</u> |
| FPE _{min} | 0.0129 | 0.0128 | 0.0143 | 0.0125 | 0.0143 | 0.0155 |
| Corresponding lag | 3 | $n_y=3$ | $n_y=2$ | $n_{\pi^f}=5$ | 1 | 1 |
| <i>Polynomial Models 4:</i> | | | | | | |
| Case of CU: $\pi_t = \alpha_0 + \alpha_1(L, n_{\overline{\omega}})\overline{\omega}_t + \alpha_2(L, n_M)gM_t + \alpha_3(L, n_{\pi^f})\pi^f_t + \alpha_4(L)gy_t$ | | | | | | |
| Cases of M1 and M2: $\pi_t = \alpha_0 + \alpha_1(L, n_{\overline{\omega}})\overline{\omega}_t + \alpha_2(L, n_M)gM_t + \alpha_3(L, n_y)gy_t + \alpha_4(L)\pi^f_t$ | | | | | | |
| | <u>gy</u> | <u>$\pi^f = \pi_{-1}$</u> | | | | |
| Case | <u>CU</u> | <u>M1</u> | <u>M2</u> | | | |
| FPE _{min} | 0.0118 | 0.0131 | 0.0147 | | | |
| Corresponding lag | $n_y=2$ | 6 | 1 | | | |

As common case for monthly time series, n_v should be set at 12 months or higher. But n_v here is set a priori only at 6 months due to the limitation of the sample period (see

also some other justifications in Section D). The Table C.1 summarizes the results of calculation of the minimum FPEs that identify the appropriate lag lengths of the determinants of inflation in Model (35) for three cases of using *CU*, *M1*, and *M2*. FPE_{\min} is minimum FPE for the regressions corresponding to each polynomial model and each x_t . π^e is not included in the specifications for the cases of *M1* and *M2* since the corresponding minimum FPEs in the last step are greater than those in the previous step. As a result, the specifications of Model (35) to be estimated include the following determinants with their lags: for the case of *CU*: ϖ ($n_{\varpi}=6$), gCU ($n_M=1$), π^e ($n_{\pi}=5$), and gy ($n_y=2$); for the case of *M1*: ϖ ($n_{\varpi}=6$), $gM1$ ($n_M=2$), and gy ($n_y=3$); for the case of *M2*: ϖ ($n_{\varpi}=6$), $gM2$ ($n_M=3$), and gy ($n_y=2$).

D. The appropriateness of the single-equation estimates for Model (35)

The assessment and interpretation of the estimation results of the specifications of Model (35) are implicitly based on the assumption that causation is one-way from the right-hand-side (RHS) determinants to inflation without any significant feedback. The Granger's test for causality is now implemented to provide a formal testing of this possible feedback.

Following the common procedure for the causality test (see, for example, Sargent (1976), Beltas and Jones (1993)), each determinant $x \in \{\varpi, gCU, gM1, gM2, gy\}$ is regressed on lagged x and lagged π to permit testing the null hypothesis that π does not influence x (ie., that the coefficients on lagged π are zero). The regressions include six lagged values of x and six, eight, and twelve lagged values of π . The F-statistics

for testing the null hypothesis and the implication of causality from inflation to the determinants of inflation are reported in Table D.1. There is no problem for the gy . Over the period of less than one year, gM and ϖ can be regarded as exogenous to the movement in prices. Over the longer run, the relationship between these variables and the inflation rate becomes more complex with two-way causalities (see also the main text for the effect of the RHS determinants on inflation). This suggests that a vector autoregressive model (VAR) could be more appropriate for studying the relationship between money, exchange rate and interest rate, output and prices if much longer time series could be obtained.

Table D.1: Granger-Causality from Inflation to the Determinants of Inflation

| | ϖ | gCu | $gM1$ | $gM2$ | gy |
|------------------------------------|----------|---------|----------|---------|-------|
| F-statistic (6 lags on π) | 0.199 | 0.729 | 0.682 | 1.162 | 0.631 |
| Causality ($\pi \Rightarrow x$?) | no | no | no | no | no |
| F-statistic (8 lags on π) | 1.428 | 0.795 | 0.869 | 1.505 | 0.911 |
| Causality ($\pi \Rightarrow x$?) | no | no | no | no | no |
| F-statistic (12 lags on π) | 5.842*** | 2.648** | 3.461*** | 2.434** | 0.668 |
| Causality ($\pi \Rightarrow x$?) | yes | yes | yes | yes | no |

The regressions of Model (35) focus, however, only on the possible (long-lasting) effects on the inflation rate within a time period much less than one year. There are some justifications for this choice. The available data sample covers only slightly more than 4 years. More importantly, the choice can be justified by the fact that markets in Vietnam are very sensitive and respond quickly to the changes in macroeconomic policy as well as to the changes in variables like deposit interest rate,

exchange rate, and some outputs (eg., food and foodstuffs, building materials...).

Thus, the single-equation regressions can be regarded as reasonable for analysing the inflationary process in the first half of the 1990s.

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